

CONFIDENTIAL

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R&D STRATEGIC PLAN

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Issued to: A. Cliff Lilly

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EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

The PM USA R&D Strategic Plan was developed using a thorough stepwise process in order to ensure that R&D was: 1) maximizing its resources, 2) devoting its efforts to those areas which will have the highest probability of benefiting Philip Morris Companies, and 3) intelligently anticipating future trends so that research and development of new products for changing markets and conditions will be carried out before these products are actually needed. The actual mechanism utilized to develop this plan was as follows. A **Mission Statement** was written which summarizes the overall goals and objectives of Philip Morris USA R&D. A thorough internal and external **Situational Analysis** was carried out. The internal situational analysis focused on PM USA R&D and PM Europe R&D programs and resources. The external situational analysis included social and governmental influences, domestic competition, R&D suppliers, and areas of needed technology. The following step was an **Analysis of Future Factors**. Eleven factors were identified which were judged to have a significant effect on the future of the industry. The anticipated changes over the next five years in each of these factors were then considered to determine what effect they would have on both the industry and on Philip Morris USA. As a consequence of this analysis six **Strategic Goals** were then developed. These strategic goals are:

1. **Aggressively support the current business.**
2. **Develop products which address the consumers' desire to reduce their health concerns.**
3. **Develop new products which address the public's desire to reduce environmental tobacco smoke.**
4. **Develop new products which can be marketed using current strategies and give smokers a product advantage.**
5. **Identify new product/process concepts and develop products/processes for the international market.**
6. **Provide a broad foundation of basic research that will generate new product concepts in 5-15 years.**

Having identified where we want to be in 5 years (strategic goals) and where we are now (situational analysis), a set of recommendations which provides the cornerstone for implementing the proposed strategy was developed for implementation in 1988. These recommendations are to:

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1. Obtain the Necessary Technical Skills:

- In order to develop successful new products in areas of consumers' health and social concerns, unique answers to difficult technical questions must be sought.
- To develop successful products in the next 5 years which address consumer concerns, we must learn how to control combustion, understand aerosol formation, lower tobacco weight by binding shreds, develop novel selective filters, and use sophisticated extraction techniques.
- To accomplish this work we need more and stronger skills in physical chemistry, physics and engineering.
- We must technically broaden our staff by intensive internal and external training programs, or we must increase the natural "turnover" rate of the laboratory so as to obtain the necessary skills by new hiring.
- We must increase the technical quality of the organization.
- Lastly, the senior technical staff must drive themselves to become aware and competent in new areas and lead, by example, in increasing their technical ability, enthusiasm and work ethic.

2. Increase our Commitment to Product Development:

- If the international area of new product development is to gain the spotlight that it deserves because of the growth potential in that area, then the number of product development people must increase. In addition, we need to ensure a close interface with Marketing in order to maintain a flow of meaningful product concepts.
- An increase of 5 to 10 quality product development people in the next 5 years is necessary.
- Selection and training of these people should start **immediately** in order to meet the needs in this 5 year period.
- This could represent an opportunity to internally train a number of scientists from the research groups and place them into Product Development.
- This in turn will allow the infusion of new blood and the correct skill mix into the research and

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technology development areas that we need for the future.

3. Ensure that we Actively Pursue Basic Research and New Technology:

- Philip Morris USA R&D must provide the basic research for the support of both the US and the international tobacco business, since the Corporation has no other organization to supply this function.
- We must double our basic research in certain areas of the business.
- Consumer testing research, flavor research (including biotechnology to generate natural flavors), filtration and aerosol research and research on altering the combustion properties of tobacco are areas of critical importance to strategic new products.
- We recommend that it will require 30-36 people, an increase of 18-24, dedicated to basic research to give PM USA a base for future new products.
- We must continue to look for new technology externally. A planned effort will have to be made to be aware of what universities and research companies are doing.
- We must establish a permanent Technology Assessment Group with representatives from Richmond Operations to investigate and apply new technology.
- Our external programs to develop new technology will only be successful if we have close ties with the outside work. This means that we have to be prepared to devote internal resources along with dollars to the outside technology awareness programs.

4. Continue to Support the Current Business:

- By far the largest resource allocation at R&D is in this area.
- There are three distinct types of programs which fit into this area; namely, programs which are day-to-day operational programs (chemical intelligence, materials evaluation and customer complaints); programs which are concerned with quality issues (flavor specifications and entomology); and programs which have been designed

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to react to either financial, government or social pressures (lowered biological activity, tobacco specific nitrosamines, reduced sidestream, alternate humectants, ignition propensity, and optimization of reconstituted products).

- We recommend that we still support this area strongly, but that we decrease the number from 135 to 90 so as to allow more basic research to be carried out.
- It is essential that QA and Engineering carry out much of the new work in this area to allow R&D to increase its commitment to the longer term work that ensures the Corporation prospers in the future.

The planning effort for the remainder of 1987 will incorporate these recommendations into specific operational plans. In 1988 we will continue to refine these operational plans, refine the strategic plan, and extend it to a ten year period.

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A. R&D MISSION STATEMENT

Philip Morris USA is chiefly in the tobacco products business as the number one cigarette product company in the USA. Our continued success, growth and profitability is dependent upon the recognition of the consumers' present/future wants and needs and improving our competitive advantage in the industry. We must offer the consumer the highest quality, most satisfying flavor and most technologically advanced tobacco products while striving to be the low cost industry producer.

To support the above Company mission, R&D has three main responsibilities:

1. Our first responsibility is to our present product lines. The current market share must be protected. R&D will initiate new concepts and programs that will improve the existing products and processes of manufacturing which will result in continued brand loyalty, brand extensions and low cost production.
2. Our second responsibility is to develop new technology-driven products that will satisfy future customer wants and external requirements. These products will be in the areas of environmental smoke reduction, health concerns, unique flavors, fire safety, biological activity, and other innovative products which will capture new volume and market share of 50% by 1995.
3. Our third responsibility is to be the technology storehouse for the Corporation.

B. SITUATIONAL ANALYSIS

Situational Analysis is divided into two parts - internal and external. The internal analysis covers PM USA R&D and PM Europe R&D programs. External analysis covers competitors, government and society, suppliers, and outside technology.

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1. Internal Analysis

The 1987 PM USA R&D programs were formulated at the December 1986 R&D Quarterly Planning Conference. The following 13 major programs were approved for 1987 at that conference:

1. MENTHOL
2. LOW TAR/HIGH TASTE
3. PROJECT ART
4. REDUCED DENSITY ROD AND FOAM BOUND ROD
5. IGNITION PROPENSITY
6. SIDESTREAM CONTROL
7. INTERNATIONAL PRODUCT SUPPORT
8. OPERATIONS SUPPORT
9. OPTIMIZATION OF RECONSTITUTED MATERIALS
10. ALTERNATE HUMECTANTS
11. BONDED ENDS
12. TOBACCO-SPECIFIC NITROSAMINES (TSNA)
13. LOWERED BIOLOGICAL ACTIVITY

To obtain the most accurate data possible regarding these internal programs, questionnaires which asked for the following information were sent to all R&D Managers: 1) list all **projects** or **programs** which were being worked on in the Division; 2) give the **customer** for each program; 3) give the **objective** of the program; 4) indicate the **estimated completion date** if it was a short term program, or **intermediate milestones** with dates if it was a long term program; and 5) specify the **number of people** associated with the program and the **skills** being used. This information was summarized for each Division, and the summaries are given in Appendix A.

Table 1 shows the general break out of the R&D staff into line and support functions, irrespective of program commitments. In addition, resource allocation data were obtained which included the percentage of R&D personnel (line and support) allocated to major programs (48.6%), other programs (9.8%), and unallocated support (41.6%).

The total personnel allocated to each major program and the number of Divisions involved are given in Table 2. The largest program in terms of personnel is Operations Support

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TABLE 1
R&D ASSIGNED AND SUPPORT FUNCTION BY DIVISION

| | <u>Primary Function</u> | |
|-------------------------------|-------------------------|------------------|
| | <u>Assigned*</u> | <u>Support</u> |
| | <u>Personnel</u> | <u>Personnel</u> |
| Product Development | 17 | 0 |
| Flavor Development | 18 | 3 |
| Cigarette Technology | 24 | 1 |
| Product Evaluation | 3 | 26 |
| Development Engineering | 14 | 6 |
| Tobacco Fundamentals | 25 | 0 |
| Tobacco Materials | 15 | 18 |
| Tobacco Processing | 0 | 49 |
| Biochemical Research | 56 | 0 |
| Physical Research | 28 | 0 |
| Analytical Research | 30 | 22 |
| Chemical Research | 30 | 0 |
| Computer Applications | 0 | 30 |
| Cigarette Testing | 0 | 53 |
| Administrative Services | 0 | 41 |
| Technical Information Section | <u>0</u> | <u>10</u> |
| Administrative & Clerical | Total | 260 |
| | | 269 |
| | | <u>32</u> 301 |

*Assigned to project or program.

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TABLE 2
RESOURCE ALLOCATION SUMMARY
FOR R&D MAJOR PROGRAMS*

| <u>Program</u> | <u>Total Personnel</u> | <u>No. of Divisions</u> |
|-------------------------------|------------------------|-------------------------|
| Menthol | 16.7 | 7 |
| Low Tar/High Taste | 17.7 | 10 |
| Project ART | 37.2 | 15 |
| Reduced Density Rod | 26.0 | 11 |
| Ignition Propensity | 6.7 | 6 |
| Sidestream Control | 14.7 | 7 |
| Int. Prod. Support | 37.7 | 8 |
| Operations Support | 60.6 | 10 |
| Optimization of Recon | 17.2 | 7 |
| Alternate Humectants | 8.3 | 7 |
| Bonded Ends | 5.6 | 2 |
| Tobacco Specific Nitrosamines | 7.6 | 2 |
| Lowered Biol. Activity | 17.0 | 3 |
| TOTAL | 273.0 | |

*This table includes both line personnel and support for major programs.

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with 60.6 people, while the smallest is Bonded Ends with 5.6 people. Number of Divisions involved range from 15 for Project ART to 2 for Bonded Ends and Tobacco Specific Nitrosamines. A listing of other programs is given in Table 3. An interesting observation is that other programs in Development tend to be numerous, with small numbers of people working on each one, while in Research they tend to be fewer with larger numbers of people involved. Lastly, each Division's contribution to unallocated support is given in Table 4. The Divisions with the largest contribution to unallocated support are Development Engineering, Tobacco Processing and Fabrication, Analytical Research, Computer Application, Administrative Services, Cigarette Testing Services and the Technical Information Facility. The administrative and clerical staff have been added into Table 4 to give a total staff of 561 people.

Some interesting conclusions were drawn from an examination of the responses to the questionnaires. The first was that there were multiple customers for each program, depending on the Division in which the work was being carried out. In general, this is a natural consequence of the flow from Research to Development. A second interesting observation was that since the focus of our quarterly Planning Conference has been on operating plans virtually all completion dates were either in 1987 or 1988. For many programs, however, those are intermediate milestones, while actual completion will not be achieved until considerably later. This indicates good operational planning but insufficient strategic planning.

An assessment of the impact of PMI needs on USA R&D was also carried out. Two major overseas areas for potential growth were identified; namely, menthol products and American blends. The paramount importance of economics was also stressed with respect to third world countries. One need which was clearly perceived was for new tobacco processes which are not capital intensive and do not require high technology to maintain. Other product concepts which were considered to be important were low delivery cigarettes, new packaging concepts, sweeter sidestream aroma, Project Trim, total blend expansion and reduced density rods.

PM Europe R&D was visited in late July, and in-depth conversations were held with a number of key individuals in the Research Center. Not surprisingly, they are wrestling with many of the same problems with which we are dealing. However, considering the fact that they have fewer resources than we do, they have dealt with their problems somewhat differently. A summary of the key points which were learned is given below:

1. R&D Europe will undertake product research specifically addressed to PME needs. It plans, however, to utilize the Cologne laboratory for basic

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TABLE 3

SUMMARY OF OTHER R&D PROGRAMS BY DIVISION

**(Excludes Personnel Committed to
Priority Programs & Support Personnel) -**

- A. DOMESTIC PRODUCT DEVELOPMENT (0.5)**
- B. INTERNATIONAL PRODUCT DEVELOPMENT (0)**
- C. CIGARETTE TECHNOLOGY (11.8)**
 - 1. Storage Studies (0.5)
 - 2. Product Monitoring Studies (0.5)
 - 3. New Package Materials Evaluation (0.5)
 - 4. Cigarette Component Investigations (1.5)
 - 5. Menthol Application (0.5)
 - 6. New Filter Concepts (1.5)
 - 7. New Packaging Development (1.0)
 - 8. New Cigarette Concepts (1.5)
 - 9. Marlboro Standardization (0.8)
 - 10. Flavor Encapsulation (1.0)
 - 11. New Instrumentation (1.5)
 - 12. Other Projects (1.0)
- D. FLAVOR DEVELOPMENT (7.3)**
 - 1. New Products (0.8)
 - 2. Sweeteners (1.0)
 - 3. New Filter Concepts (0.5)
 - 4. Distinctive Flavors (0.5)
 - 5. Brand Modification (0.5)
 - 6. Flavor Specifications (0.9)
 - 7. Non-Volatile Flavor Investigations (1.2)
 - 8. Marlboro Standardization (0.6)
 - 9. Other Projects (1.3)
- E. PED (3.0)**
 - 1. Competitive Testing (0.5)
 - 2. Testing Research (2.5)
- F. DEVELOPMENT ENGINEERING (0)**
- G. TOBACCO FUNDAMENTALS (1.0)**
 - 1. Firmness While Smoking (0.8)
 - 2. Coal Strength (0.2)
- H. TOBACCO MATERIALS DIVISION (4.1)**
 - 1. Diet Development (2.2)
 - 2. Strip Unfolding (0.6)
 - 3. Superheating Cut Filler (1.3)

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- I. **TOBACCO PROCESSING (0)**
- J. **CHEMICAL RESEARCH (8.4)**
 - 1. Flavor Research (4.2)
 - 2. Health Physics (2.0)
 - 3. Agronomy (Tobacco) Research (1.3)
 - 4. MDL Program (0.5)
 - 5. Other Projects (0.4)
- K. **ANALYTICAL RESEARCH (10.9)**
 - 1. Oven Volatiles (3.0)
 - 2. Methods Development (3.6)
 - 3. Glycoproteins (0.9)
 - 4. MDL (1.0)
 - 5. Blend Composition (2.4)
- L. **BIOCHEMICAL RESEARCH (8.0)**
 - 1. Entomological Research (5.0)
 - 2. Electrophysiological Research (3.0)
- M. **PHYSICAL RESEARCH (0)**
- N. **COMPUTER APPLICATIONS (0)**
- O. **ADMINISTRATIVE SERVICES (0)**
- P. **CIGARETTE TESTING (0)**

TOTAL - 55.0

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TABLE 4

**R&D INTERNAL (NOT ALLOCATED TO A PRIORITY PROGRAM) SUPPORT
BY DIVISION AND ADMINISTRATIVE STAFF**

| | |
|----|---|
| A. | DOMESTIC PRODUCT DEVELOPMENT (0) |
| B. | INTERNATIONAL PRODUCT DEVELOPMENT (0) |
| C. | CIGARETTE TECHNOLOGY (1.0) |
| D. | FLAVOR DEVELOPMENT (2.7) |
| E. | PRODUCT EVALUATION (0) |
| F. | DEVELOPMENT ENGINEERING (20.0) |
| G. | TOBACCO FUNDAMENTALS (6.0) |
| H. | TOBACCO MATERIALS (18.0) |
| I. | TOBACCO PROCESSING AND FABRICATION (19.0) |
| J. | CHEMICAL RESEARCH (0) |
| K. | ANALYTICAL RESEARCH (12.3) |
| L. | BIOCHEMICAL RESEARCH (0) |
| M. | PHYSICAL RESEARCH (0) |
| N. | COMPUTER APPLICATIONS (29.0) |
| O. | ADMINISTRATIVE SERVICES (41.0) |
| P. | CIGARETTE TESTING (42.0) |
| Q. | TECHNICAL INFORMATION FACILITY (10.0) |
| R. | ADMINISTRATIVE STAFF (32.0) |

TOTAL 233.0

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research. This research will also support applicable areas of PM USA R&D.

2. There is a real desire to strengthen ties between PM Europe R&D and marketing. One possible way to do this is to transfer a PM Europe R&D person to PMI marketing in New York for six months. The objective would be to increase the awareness of both marketing and product development personnel for each other's problems.
3. All groups within PM Europe R&D will spend considerable time with their customers. It is planned that as time progresses many product ideas will emerge via an R&D push as opposed to a marketing pull.
4. PM Europe R&D should continue to strengthen ties with PM USA R&D. Several possible ways of doing this are by exchange of personnel, mutual visits and joint meetings.
5. All new programs will be discussed with PM USA R&D before implementation. Richmond R&D would be expected to give input and advice. Richmond will provide active consulting and assistance.
6. PM Europe R&D will adopt a planning structure similar to that being developed at PM USA R&D.

A detailed summary from the PM Europe R&D visit at Neuchatel is given in Appendix B.

2. External Analysis

Competitive Analysis

The first portion of external analysis which will be discussed deals with PM USA's domestic competitors. A competitive profiles file has been developed and is included in Appendix C. This file at present contains a summary of financial data, relevant organizational charts, biographies on key R&D personnel, patent and publication data, and a list of each competitor's non-tobacco subsidiaries. It should be pointed out that much of the financial data pertaining to our competitors' R&D efforts has had to be derived from a careful analysis of published data. In the future this file will also contain abstracts of publications, abstracts of patents, continuous updates of data already included, and information derived from contacts of PM USA R&D employees with competitors' employees at meetings and seminars.

In that R. J. Reynolds is our major domestic competitor, a much more detailed analysis of their R&D function has been prepared and is discussed later in this

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plan. As a consequence of including this information in the body of this plan, information regarding R. J. Reynolds, except for biographies of key personnel, will not be found in Appendix C

Social and Governmental Influences

An analysis of social and governmental influences which are of importance to PM USA is given in Appendix D. This analysis concerned itself with 1) social acceptability of smoking and the increased restrictions which are accompanying decreased acceptability; 2) product liability; 3) cigarette taxation; 4) advertising and promotion issues; and 5) self extinguishing cigarettes. The conclusion of this analysis is that the above factors are of considerable importance and constitute both threats to the industry and opportunities for potential new products.

R&D Suppliers

A list of suppliers on which R&D is dependent was developed. It is shown in Table 5. Our dependence on these suppliers can be easily demonstrated using a few examples. We rely completely on the paper manufacturers such as Ecusta and Kimberly Clark for the preparation of cigarette papers for the Reduced Sidestream Program. Ideas generated at R&D for new types of experimental papers for reduced sidestream cannot be followed up internally since we do not have the equipment for making such papers. New types of filter tows which might allow selective filtration cannot be done without involving either Celanese or Tennessee Eastman at the inception of such a study since we lack tow-making equipment and experience. Also, we have been historically dependent on outside flavor companies for our flavor needs despite considerable capability in house. Lastly, with the importance of pectin binders in our low density programs, we must begin dealing with pectin suppliers.

Required New Technology

The last part of external analysis which was carried out involved an analysis of areas of needed technology. The list that has been generated at this time is given in Appendix E. Refinement and focusing of this list will be carried out as the strategic plan develops.

Based on our current situational analysis, lists of internal strengths and weaknesses (Tables 6 and 7) were developed from our internal analysis, and lists of external threats and opportunities were developed from our analysis of external factors (Tables 8 and 9). The internal strengths and weaknesses were used to generate recommendations which will be discussed in a later section of this document.

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TABLE 5
SUPPLIERS UPON WHICH PM R&D IS DEPENDENT

| <u>Suppliers</u> | <u>Dependence</u> |
|--|---|
| 1. Ecusta Paper Co. Kimberly-Clark Co. | PM is dependent for production; PM R&D needs to increase input to these companies' research efforts. |
| (Plug-wraps, tippings and cigarette wraps) | |
| 2. Celanese Co. Tennessee Eastman Co. | PM will remain dependent but must increase influence on their R&D direction. |
| (CA tow and experimental filter materials) | |
| 3. Fuller, Findley, Upaco and National | PM needs to supply specifications and directions. |
| (Adhesives) | |
| 4. Hauni, Molins, GD and Sasib | PM is presently dependent, but we have decisions to face in low density maker program. |
| (Cigarette production equipment) | |
| 5. Givaudan, IFF, Firmenich, Fritzche, Takasago, Naarden, Norda, PFW, + others | Dependence by R&D, but we will control specifications. |
| (Flavor houses) | |
| 6. Grinsted, Hercules and Obipecktin | R&D is dependent but should control properties and specifications. |
| (Pectin binders)* | |
| 7. General Scientific | R&D depends on supplier. |
| (Equipment and computers) | |

*Pectin binders are needed for the reduced density rod program.

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TABLE 6

**LIST OF INTERNAL STRENGTHS GENERATED
BASED ON INTERNAL SITUATIONAL ANALYSIS**

1. Broad scientific base
2. Rapid response to short term goals
3. Good short term operational plans
4. Well placed university contacts
5. Very good physical resources
6. Money available for justifiable programs
7. Considerable multi-division interactions
8. Good understanding of conventional cigarette construction
9. Local Manufacturing/Engineering/Computer support services

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TABLE 7

**LIST OF INTERNAL WEAKNESSES GENERATED
BASED ON INTERNAL SITUATIONAL ANALYSIS**

1. Insufficient long range planning
2. No detailed plan for international process development
3. Lack of new blood
4. Poor communication of role and mission to the bench level
5. Undermanned in Product Development at both project and support level
6. Little long term (5 yr. +) "Product" development
7. Lack of competitive intelligence
8. Barriers to technology transfer within R&D and between R&D and Operations are still present
9. Lack of knowledge of cigarette manufacturing and processing by bench scientists
10. Lack of direction to suppliers as to PM needs

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TABLE 8

**LIST OF EXTERNAL THREATS BASED
ON EXTERNAL SITUATIONAL ANALYSIS**

1. Upward taxation pressure
2. Government regulation of cigarette construction
(Ignition Propensity)
3. Government regulation of additives
4. Social unacceptability
5. Foreign competition
6. Product liability
7. Technical obsolescence of product
8. Rapid expansion of price value at expense of full
margin
9. Smoking and health issues
10. Limitation or ban on advertisement
11. Potential product tampering

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TABLE 9

LIST OF EXTERNAL OPPORTUNITIES
BASED ON EXTERNAL SITUATIONAL ANALYSIS

1. Product with perceived health benefits
2. International market demand
3. Menthol products
4. Growing ethnic markets
5. Proprietary processes
6. Environmental smoke abatement - design and specification
7. Product for former smokers
8. Reduce the cost of manufacturing
9. Reduced ignition propensity product

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C. ANALYSIS OF FUTURE FACTORS

Eleven factors have been identified which are judged to have considerable impact on the future of the cigarette industry. These factors are social and health pressures, government influences, product liability suits, foreign competition, product tampering, technical obsolescence of the product, domestic competition, USA management decisions, changes in the consumer base, domestic industry volume and foreign industry volume. Each of these factors have been evaluated in order to determine how they would affect our business over the next five years. A summary of this analysis is given below.

1. Social and Health Pressures: These pressures will continue to intensify over the next five years. Particular concerns which have been identified are the desire for cigarettes to have low sidestream - including visibility, aroma, and irritation - by the non-smoker; the need for methods for environmental smoke abatement; an interest in low nicotine cigarettes; cigarettes which would be perceived by the consumer as "safer"; and the desire for reduced tar cigarettes which retain full flavor. It should be noted that developing strategies to market and advertise such products is a formidable challenge.
2. Government Influences: The impact of the government on the US industry is also expected to increase in the next five years. Specific areas include increases in excise taxes, possible fire safety regulations, problems of introducing new brands in case of an advertising ban, smoking restrictions, import/export policies, changes in warning labels, and regulations regarding additives. The ignition propensity and reduced density rod programs address two of these concerns.
3. Current Product Liability Suits: This factor is not an R&D strategic concern. There is nothing that R&D can do now to influence current cases. As a consequence, this factor has been dropped from further analysis. However, care should be taken to ensure that we minimize the probability of product liability suits in the future.
4. Foreign Competition: Foreign competition in the USA is not seen to be a major factor in the next five years. It is felt that entry barriers are too high for a foreign concern to establish a major foothold in the US market. Although the possibility exists that a foreign company could buy out a current US company, the effect would only be to change the nature of domestic competition. This factor has also been dropped from further consideration. The

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recent introduction of the RJR device emphasizes the continuing importance of carefully monitoring potential foreign competition, particularly Japan.

5. **Product Tampering:** The possibility clearly exists that product tampering problems will increase in the future. However, R&D already has an existing program to develop tamper-evident packaging being carried out by an outside laboratory. As a consequence, this factor will not be considered further.
6. **Technical Obsolescence of the Product:** One of the advantages of the cigarette business is that products have long life cycles, and technical obsolescence of the product rarely occurs. However, product changes have occurred in the past; for example, the filter cigarette. Companies which adopted the attitude that the filter cigarette was simply a fad paid dearly for this error. It is quite possible that within the next ten years new developments as revolutionary as the filter cigarette will change our current product. Some possible developments are a non-burning article, a different delivery system for nicotine such as a tobacco-containing chewing gum (Masterpiece), a low tar/high taste cigarette, a cigarette which burns at a significantly lower temperature, and a new performance enhancement product. Some of these possibilities are currently being pursued, and others are clearly addressed in the strategic goals discussed below.
7. **Domestic Competition:** There is every reason to assume that our competitors will become much more aggressive during the next five years because of our success in the US marketplace. As a consequence it should become a major component of our strategy to be as aware as possible of the thrust of their research and their development of new products. In order to protect both our current and future business it is extremely important to maintain quality, to reduce costs as much as possible, and to market products with a clear consumer benefit. The last point is not trivial since it is first necessary to clearly understand what the consumer wants, and secondly to be able to be certain that his requirements are satisfied. Methodologies must be developed to answer these questions.
8. **USA Management Decisions:** Philip Morris USA management decisions such as the size of R&D, financial strategy, market strategy, and pricing strategies clearly influence R&D programs. However,

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it is PM USA R&D's responsibility through the use of a well written Strategic Plan to bring before Management issues which require R&D involvement, and convince them to continue to provide the necessary resources to accomplish the necessary goals. Consequently no further analysis of this factor has been carried out.

9. **Changes in Consumer Base:** Changes in consumer base create two separate issues. The first, addressed in this section, deals with the possibility that as demographics change, smokers currently purchasing Philip Morris products will switch to competitors' products. The second issue, discussed in the following section, addresses the effect of demographic changes on total industry volume.

The number of people reaching age 18 peaked in 1979 and declined until 1986. It will increase until 1988, then decline until 1991 before beginning a slow decrease. The growth of Philip Morris was the result of Marlboro having become the brand of choice among young people at the very time when the number of people reaching smoking age was increasing. A few years later something similar happened to Virginia Slims. As smokers move from the 18-24 year-old group, they have a tendency to switch brands. All available data, however, at this time indicate that people do tend to stick with PM brands after having started on them. Consequently changes in the consumer base would not seem to be an issue with respect to switching.

10. **Domestic Industry Volume:** That domestic industry volume will be decreasing over the next five years appears to be a foregone conclusion. Although factors such as excise taxes and health concerns play a role in such a decline, the easiest factor to quantify is the anticipated change in demographics. While the number of 18-24 year-olds will decline almost until the end of the century as mentioned above, the number of people moving into the quitting ages (45 and over) will increase sharply. Thus the core group of people available to smoke (ages 18-44), which increased from 65.7 million in 1964 to 103.6 million in 1984, will peak at 107.2 million in 1990 and decline to 104.8 million in 2000. There are two strategic objectives which arise as a consequence of this trend. The first is to reverse the anticipated market decline. Three possible approaches to accomplish this would be to determine what products would bring back former smokers, to develop a product perceived by smokers and non-smokers as safe, and to develop a new type of

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product which would be socially acceptable to non-smokers. It should be noted that R&D's new concept study will include former smokers for the first time. The second strategic objective is to increase PM's market share. The single most important product which could accomplish this objective would be a king size free-standing menthol cigarette.

11. Foreign Industry Volume: In contrast to the domestic situation all available data indicate that most foreign markets will be increasing during the next five years. As a consequence foreign sales represent perhaps the best possibility for growing the company during this period. Methods to take advantage of this market include producing cigarettes at lower cost, developing economical methods of tobacco processing, and increasing our international product development and marketing effort.

The information detailed above was used to develop six strategic goals which should be the cornerstone of the R&D effort during the next five years. These goals are discussed in the next section.

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D. R&D FIVE YEAR STRATEGY

The six strategic goals generated from an analysis of future trends are as follows:

1. **AGGRESSIVELY SUPPORT THE CURRENT BUSINESS. --**
2. **DEVELOP PRODUCTS WHICH ADDRESS THE CONSUMERS' DESIRE TO REDUCE THEIR HEALTH CONCERNS.**
3. **DEVELOP PRODUCTS WHICH ADDRESS THE PUBLIC'S DESIRE TO REDUCE ENVIRONMENTAL TOBACCO SMOKE.**
4. **DEVELOP NEW PRODUCTS WHICH CAN BE MARKETING USING CURRENT STRATEGIES AND GIVE SMOKERS A PRODUCT ADVANTAGE.**
5. **IDENTIFY NEW PRODUCT/PROCESS CONCEPTS AND DEVELOP PRODUCTS/PROCESSES FOR THE INTERNATIONAL MARKET.**
6. **PROVIDE A BROAD FOUNDATION OF BASIC RESEARCH THAT WILL GENERATE NEW PRODUCT CONCEPTS IN 5-15 YEARS.**

These strategic goals by themselves do not represent a radical departure from the way we are currently conducting the R&D effort. However, when these goals are placed into the context of the changes anticipated to occur over the next five years it can be seen that there are clearly changes in emphasis. Tables 10-15 show for each strategic objective the current and projected programs. For each program, both current and future, estimates of resource allocations are given distributed among research, product development, process development, and support areas. The differences between current and future programs are discussed below.

Support Current Business

The first strategic goal addresses programs which support our current business (Table 10). This aspect is currently the largest effort at R&D. Although we realize that all of these activities are of the utmost importance, we would like to achieve an overall reduction of the number of R&D personnel presently working in this area and turn some of these activities over to QA and Engineering. We have proposed a reduction of 45 R&D people working in this area over the next 5 years. These individuals would then be shifted into other areas.

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TABLE 10
STRATEGIC GOAL NUMBER 1

AGGRESSIVELY SUPPORT THE CURRENT BUSINESS.

CURRENT

1. Operations Support (32 Research + 7 Process Development + 3 Product Development + 19 Support)
2. Optimize Recon (9 Process Development + 6 Research + 1 Product Development)
3. Bonded Ends (4 Process Development + 2 Support)
4. Ignition Propensity (3 Research + 2 Product Development + 1 Support)
5. Cigarette Quality (2 Product Development)
6. Entomology (5 Research)
7. Miscellaneous Programs (18 Product Development + 10 Process Development + 11 Research)

FUTURE (5 YEARS)

1. Quality (45)* (Bonded Ends, Foam Bound Rod, Optical Inspection, Optimize Recon)
2. React to Government Regulations (7)* (Ignition Propensity)
3. Respond to Marketing (38)* (Brand Maintenance, New Conventional Products, Recon Flavor Changes)

*Mix of research, development and support as needed.

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Reduce Consumer "Health" Concerns

Inspection of Table 11 indicates that we have a considerable commitment at this time to development of a product which addresses consumer health concerns. The low tar (or zero tar)/high taste program and Project ART (low nicotine) can be marketed to the consumer in such a way to convince them that they are indeed receiving a product which would be perceived as "safer". Other "health" cigarettes such as a lowered biological activity cigarette, a reduced temperature cigarette, or a reduced nitrosamine cigarette will require unique marketing concepts to convey the more sophisticated "health" changes to the consumer. There are two features which all of the above programs have in common. The first is that they require high technology approaches in order to develop cost competitive products. The second is that these programs are product oriented, although some of them are defensive in nature as well (e.g., lowered nitrosamines).

Although most of these current programs will still be in force five years hence, anticipated progress will create changes in emphasis. With respect to the lowered biological activity program the majority of the research effort for bioassay development will be completed. Consequently, the major effort will be in the product and process development areas. The basic research portion of the tobacco specific nitrosamine program will be completed by 1992. On the other hand it is anticipated that a major effort will still be devoted to the low tar/high taste program, although the objective may be more ambitious (e.g., a no tar cigarette which tastes like an 11 mg cigarette). R&D support for a low nicotine product is also anticipated to continue, although at a considerably lower level than at present.

Several new programs are proposed. Considerable effort should be devoted to a non-burning article since this represents the best approach to a zero tar cigarette. Research must be initiated on the development of a cigarette with decreased burn temperature as an approach to a product with lowered biological activity. Work should be initiated on an alternate method for nicotine delivery. Lastly, we recommend that a significant effort be established regarding selective filtration to remove gas phase components which are objectionable to our customers. It is likely that results from such a program will be equally applicable to the domestic and the international market.

Reduce Environmental Tobacco Smoke

Table 12 reflects the recent redirection of our Sidestream Control program to encompass not only reduction of visibility but also development of an understanding of how to control specific components in sidestream. The efforts now being initiated will attack the important problems associated

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TABLE 11

STRATEGIC GOAL NUMBER 2

DEVELOP PRODUCTS WHICH ADDRESS THE CONSUMERS' DESIRE TO REDUCE THEIR HEALTH CONCERNS.

CURRENT

1. Low Biological Activity (17 Research)
2. Tobacco Specific Nitrosamines (7.5 Research)
3. Low Tar/High Taste (8.8 Research + 4.3 Product Development + 4.5 Support)
4. Project ART (17.5 Research + 4 Product Development + 7.5 Process Development + 8.5 Support)

FUTURE (5 Years)

1. Non-Burning Article (10 Research + 2 Process Development + 5 Support)
2. Cigarette with Low Biological Activity (6 Research + 2 Product Development + 6 Process Development + 6 Support)
3. Cigarette with decreased burn temperature (2 Research + 1 Support)
4. Low Tar/High Taste (9 Research + 4 Product Development + 8 Process Development + 8 Support)
5. Low Nicotine (2 Research + 6 Process Development + 2 Product Development + 3 Support)
6. Alternate Products for Nicotine Delivery (1 Research)
7. Selective Filtration (5 Research + 2 Product Development + 5 Process Development + 3 Support)

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with environmental tobacco smoke, but additional sustained efforts in this area will be required for success. Knowledge gained in this area will also need to be integrated into other products under development in the next 5 years. In addition we recommend that an increased effort be devoted to an optional smoking device. This product, as opposed to a non-burning article, is actually an environmental tobacco smoke issue since it would be used in the non-burning mode only when sidestream is an issue.

Products with a Distinct Advantage

The two major existing programs which can be assigned to strategic goal number four (Table 13) are a free-standing menthol product and a reduced density rod. The need for a free-standing menthol cigarette remains an important strategic objective. However, given our past track record it is most important to carry out the necessary consumer research to determine how to go about developing such a cigarette which will clearly offer an advantage to the customer. The effort on reduced tobacco weight also remains an extremely important strategic objective, and it should be noted that this objective is as important with respect to the international market as it is to the US market. Given the uncertainty of the worldwide economic situation, a product development effort must be devoted to generic and value added products to increase both margin and quality. Lastly, effort should be devoted to the development of new products for market segments in which PM is underrepresented.

International Products

The support of international product and process development clearly appears to be the area which needs the greatest increase in emphasis (Table 14). The fact that sustained growth is anticipated in the international market as opposed to declining sales in the US mandates growth in this area. Emphasis will be placed on establishing a high quality core group who know our business rather than on a quantitative increase of staff for this area. In addition we have no current process development work devoted to international process development needs. This omission definitely needs to be rectified.

Basic Research

Another area which needs additional emphasis is basic research (Table 15). A total of 12 individuals within the Research Center appear to be working on basic research not allocated in support of a priority program. When the effort allocated to priority programs, such as lowered biological activity which was covered earlier, is included, the number probably doubles at best. The most important area of basic research which needs to be tackled involves understanding the wants and needs of the consumer. The manner in which we test

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TABLE 12
STRATEGIC GOAL NUMBER 3

**DEVELOP NEW PRODUCTS WHICH ADDRESS THE PUBLIC'S DESIRE TO
REDUCE ENVIRONMENTAL TOBACCO SMOKE**

CURRENT

- | | |
|--------------------------------|--|
| 1. Low Sidestream - Odor | (1 Research + 0.5 Product Development) |
| 2. Low Sidestream - Irritation | (5 Research + 1 Product Development) |
| 3. Low Sidestream - Visibility | (3 Research + 2 Product Development) |
| 4. Ashtray Odor | (0.5 Research) |
| 5. Optional Cigarette | (1.5 Product Development) |

FUTURE (5 Years)

- | | |
|-------------------------------|---|
| 1. Low Visibility | (4 Research + 2 Product Development) |
| 2. Decreased Irritation | (8 Research + 1 Product Development + 1 Process Development) |
| 3. Odor Modification | (3 Research + 1 Product Development + 1 Process Development) |
| 4. Ashtray Odor | (2 Research + 1 Product Development) |
| 5. Optional Smoking Cigarette | (1.5 Product Development + 3 Process Development + 2 Support) |

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TABLE 13
STRATEGIC GOAL NUMBER 4

DEVELOP NEW PRODUCTS WHICH CAN BE MARKETING USING CURRENT STRATEGIES WHICH GIVE SMOKERS A PRODUCT ADVANTAGE.

CURRENT

1. Menthol (8 Product Development + 4 Process Development + 5.5 Support)
2. Reduced Density Rod (15 Process Development + 7 Research + 5 Support)

FUTURE (5 Years)

1. Menthol (2 Consumer Research + 1 Research + 1 Product Development)
2. Generic and Value Added (4 Product Development)
3. Reduced Tobacco (12 Process Development + 2 Product Development + 2 Research + 5 Support)
4. New Products for Segmented Markets (1 Consumer Research + 3 Product Development + 3 Support)

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TABLE 14
STRATEGIC GOAL NUMBER 5

**IDENTIFY NEW PRODUCT/PROCESS CONCEPTS AND DEVELOP
PRODUCTS/PROCESSES FOR THE INTERNATIONAL MARKET.**

CURRENT

1. International Product Support (9.5 Product Development + 1 Research + 26 Support)
2. Alternate Humectants (1 Process Development + 5 Research + 2 Support)

FUTURE (5 YEARS)

1. Product Development (12 Product Development + 26 Support)
2. Process Development (6 Process Development + 1 Product Development + 6 Support)

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products at present does not truly reflect the real world. This problem must be solved if we are going to successfully market new products. It is also recommended that consumer research be applied to former smokers and non-smokers as well. It is strongly suggested that at least two members of the marketing department take part in this research. Independent flavor research should receive considerable support in that flavor is the most readily perceived product property. Basic research in biotechnology must be carried out. However, we recognize that we cannot have a full scale biotechnology group in place within the next five years. We should emphasize the study of tobacco biochemistry so that we are prepared to tackle meaningful biotechnology problems in the mid 1990's. It is likely that biotechnology could become an important component of our flavor program. Lastly a basic filtration effort, apart from the proposed work on selective filtration, is needed. The last entry in Table 15 is an important area of basic research which was assigned to the program covered in strategic goal number 2. Consequently no resources have been allocated.

Resource Allocations

Based on the estimates of resource allocations which we have made we recommend that over the next 5 years we should add approximately 20 research and development people. These additions would be strong people in the areas of physical chemistry, physics, consumer research, aerosol science, and additions to international product development. These are projected to be outside hires so as to get "new blood" into the organization. Basically, we are counting on increased training to broaden the staff's scientific skills in new areas of science and technology along with an increase in laboratory quality by careful selection of new hires to the staff. The numbers of professional process development and research personnel most likely require no change. There does need to be more participation, however, by process development in international problems. Although the total number of research people would remain about the same, the mix of disciplines is expected to be quite different. We have a definite projected need for more physicists and physical chemists while the need for analytical chemists is anticipated to be constant.

A consequence of the changing skill set in R&D will be the increased use of high speed computers. We will see this increase for mathematical analysis and product/systems simulation. We have seen a dramatic increase in the introduction of these tools in the recent past and anticipate even greater growth in the future. The increased use of physicists and physical scientists to build mathematical models and the handing over of these models through expert systems to the product and process development staffs for routine use will be the basis of this growth.

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TABLE 15
STRATEGIC GOAL NUMBER 6

**PROVIDE A BROAD FOUNDATION OF BASIC RESEARCH THAT WILL
GENERATE NEW PRODUCT CONCEPTS IN 5-15 YEARS.**

CURRENT

1. Consumer Testing Research (2.5 Research)
2. Flavor Research (4 Research)
3. Agronomy (Tobacco) Research (1 Research)
4. Biopolymers (1 Research)
5. Electrophysiology (3 Research)

FUTURE (5 YEARS)

1. Consumer Testing Research (5 Consumer Research + 2 Marketing)
2. Flavor and Natural Products Research (6 Research)
3. Biotechnology (Biochemistry and Biology) (10 Research)
4. Basic Filtration Research (Tar Control) (5 Research + 1 Product Development)
5. Basic Aerosol Research (4 Research)
6. Altering Burn Characteristics of Tobacco

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Implementation of this plan cannot be done overnight. It requires gradual changes implemented year by year, with feedback from continued revisions to the R&D Strategic Plan. Recommendations for 1988 are given in the next section.

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E. STRATEGIC RECOMMENDATIONS FOR 1988

Earlier this document outlined six strategic goals that R&D can use to design operational plans and new technology assessment programs over the next five years and beyond. These goals are the following:

1. **AGGRESSIVELY SUPPORT THE CURRENT BUSINESS**
2. **DEVELOP PRODUCTS WHICH ADDRESS THE CONSUMERS' DESIRE TO REDUCE THEIR HEALTH CONCERNS.**
3. **DEVELOP PRODUCTS WHICH ADDRESS THE PUBLIC'S DESIRE TO REDUCE ENVIRONMENTAL TOBACCO SMOKE.**
4. **DEVELOP NEW PRODUCTS WHICH CAN BE MARKETING USING CURRENT STRATEGIES AND GIVE SMOKERS A PRODUCT ADVANTAGE.**
5. **IDENTIFY NEW PRODUCT/PROCESS CONCEPTS AND DEVELOP NEW PRODUCTS/PROCESSES FOR THE INTERNATIONAL MARKET.**
6. **PROVIDE A BROAD FOUNDATION OF BASIC RESEARCH THAT WILL GENERATE NEW PRODUCT CONCEPTS IN 5 TO 15 YEARS.**

As can be seen from the above list the strategy ranges from maintaining our present share and profitability to assuring that the company is successful in the future.

In order to accomplish successfully the R&D strategic goals there are a number of issues involving both people and organization which must be addressed. What follows is a series of specific recommendations to be considered.

1. **Necessary Technical Skills:** In order to develop successful new products in areas of consumers' health and social concerns, unique answers to difficult technical questions must be sought. At the present time much of the research in the areas of biological activity and sidestream control is carried out by biologists and flavor chemists. In the next five years we must bring this work to the product stage by controlling combustion, understanding aerosol formation, lowering tobacco weight by binding shreds, developing novel selective filters and by using sophisticated extraction techniques. To accomplish this work we need more and stronger skills in physical chemistry, physics and engineering. We must technically broaden our staff by intensive internal and external training

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programs, or we must increase the natural "turnover" rate of the laboratory so as to obtain the necessary skills by new hiring. Increasing the technical quality of the organization should accomplish more "turnover" and allow us to acquire the broader physical science skills that are needed. Lastly, the senior technical staff must drive themselves to become aware and competent in new areas and lead by example in increasing their technical ability, enthusiasm and work ethic.

2. **Organization:** While we seem to need only a different mix of research skills in the future than we now have, it is a different story with Product Development people. If the international area of new product development is to gain the spotlight that it deserves because of the growth potential in that area, then the number of product development people must increase. The rapid growth that we are experiencing in Japan and other Far Eastern areas requires that we give strong support to these areas with research and product development. An increase of 5 to 10 quality product development people as well as the appropriate support staff in the next 5 years is necessary. Selection and training of these people should start immediately in order to meet the needs in this 5 year period. This could represent an opportunity to internally train a number of scientists from the research groups and place them into Product Development. This in turn will allow the infusion of new blood and the correct skill mix into the research and technology development areas that we need for the future.
3. **Basic Research and New Technology:** Philip Morris USA R&D must provide the basic research for the support of both the US and the international tobacco business. The corporation has no other organization to supply this function. We must increase the percentage of basic research in certain areas of the business. Consumer testing research, flavor research (including biotechnology to generate natural flavors), filtration and aerosol research and research on altering the combustion properties of tobacco are areas of critical importance to strategic new products. Today only 12-15 people are involved in what can be called basic research. We recommend that this number be increased to 30-36 to give PM USA a base for future new products. The people mix currently in R&D today does not contain the skills to allow this research increase to be made.

At the same time we must continue to look for new technology externally. It is almost certain that

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much of the technology needed for our future programs is available. This means that a planned effort will have to be made to be aware of what universities and research companies are doing. Our external programs to develop new technology will only be successful if we have close ties with the outside work. This means that we have to be prepared to devote internal resources along with dollars to the outside technology awareness programs.

4. **Current Business Support:** By far the largest resource allocation at R&D is in this area. Included in this area are the Operations Support Program as well as programs dictated by quality concerns and financial and potential government constraints. These programs include optimization of reconstituted sheet, bonded ends, ignition propensity, cigarette quality, entomology, and a number of small miscellaneous programs. We recommend that we still support this area strongly, but that we decrease the number of people from 135 to 90 so as to allow more basic research to be carried out. Part of the reason that the R&D effort is so large in this area of the business is that QA and Engineering are not staffed to carry out much of the new requirements in this area. It is very important in the future that R&D shed some of the short-term support responsibility or increase people in the basic area so as to do the longer term work that ensures the corporation prospers in the future.

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F. RESEARCH AND DEVELOPMENT AT PHILIP MORRIS AND RJR

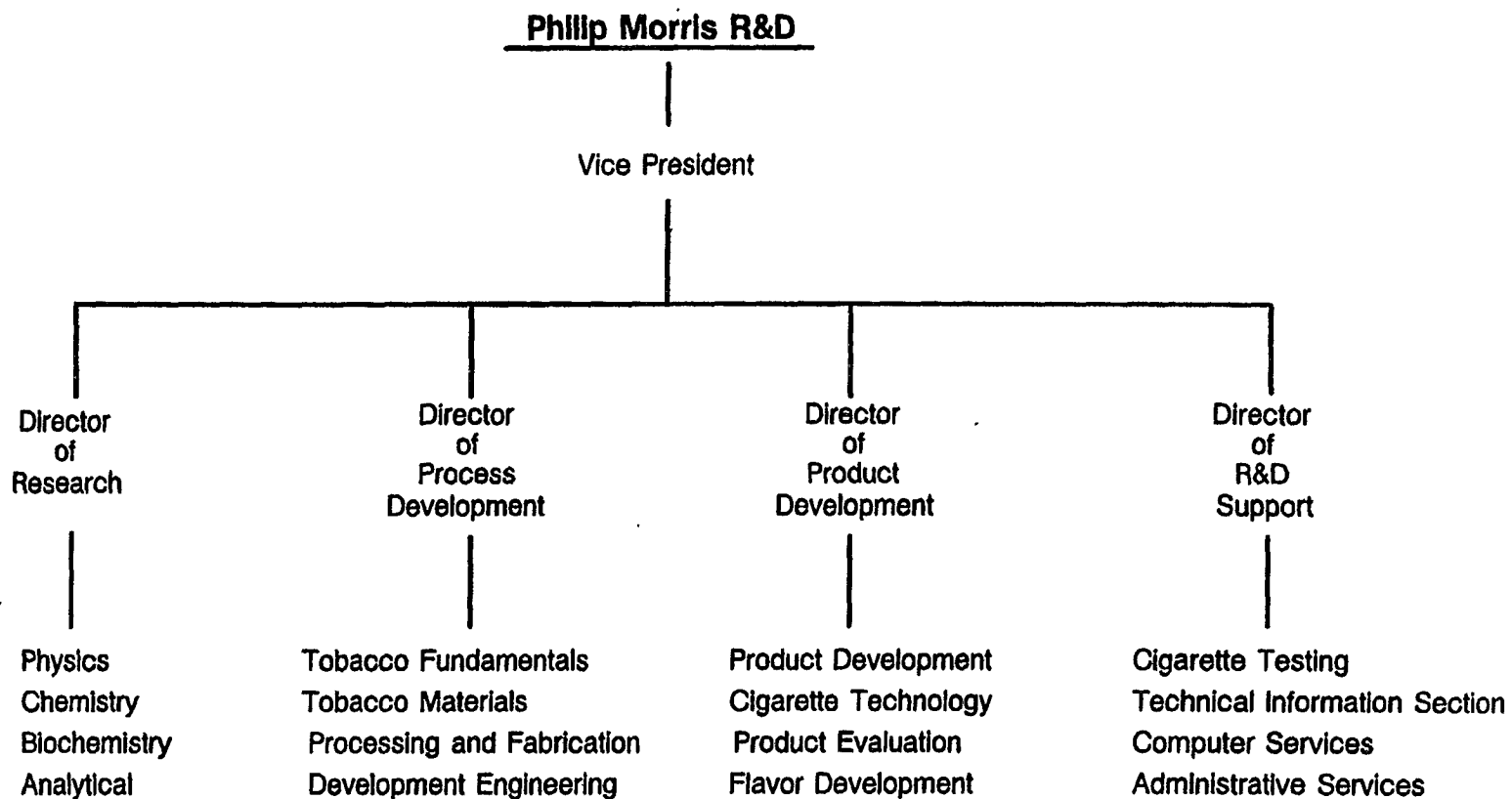
Most modern industry research and development departments are organized by discipline (chemistry, physics, engineering) but the major programs are carried out by multidiscipline teams of scientists and engineers. As we are aware, the Philip Morris Research Center is organized this way as shown in the accompanying organizational chart.

In addition to the technical discipline organization, the scientific staff is organized into a technical ladder which is similar to a university system. The levels range from Associate Scientist and Scientist to Principal Scientist and Research Fellow in a somewhat equivalent manner to the Section Leader, Manager, Director management ladder. Major programs are organized in general across directorate lines as needed and are directed by one of the Directors or senior staff people.

The RJR Research and Development organization is similar to that of PM USA R&D, although there are some differences. The following are the major groups of RJR's R&D department.

1. Applied R&D - Responsible for transferring basic knowledge into useful technology. They focus on tobacco blending, flavorants, filters, papers, packaging, and adhesives. This group is also involved with product technology and analytical methods development. (Note that at PM tobacco blending is a Leaf Department function.)
2. Fundamental R&D - This group is responsible for operating at the frontiers of science to establish the knowledge base needed by the Applied Group. The fundamental group works in identifying, developing and maintaining information concerning the basic factors which affect tobacco and smoke. (Note that recent information (September 1987) indicates that Applied and Fundamental R&D may be combined.)
3. Brand R&D - This is the new product group which works closely with Marketing and does the consumer research. It is estimated that the organization is similar to that of PM's Product Development Directorate.
4. Agricultural Programs - The responsibility of this group is to ensure a continuous supply of tobacco for RJR products. It also is responsible for RJR's agriculture programs to the tobacco community that encourage tobacco production and extension programs. Also, RJR research grants to land-grant universities are handled in this group. (Note this function is provided at PM by the Leaf Department.)

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5. Process R&D - The job of developing and improving the production process of RJR products is the responsibility of this group. This group works very closely with the Manufacturing Department. In fact, this group formerly was in the Engineering Department and moved to R&D.

In general, it appears that both the R&D and Engineering organizations at RJR have undergone considerable restructuring over the past 5 to 10 years and that it is continuing. Engineering's total head count has decreased from approximately 1000 people to the current level of less than 100. Factors in this reduction include elimination of the in-house machine shop for parts and machine repairs; the fact that Plant Operations is now responsible for all Plant Engineering related functions; and that most machine development for new brands and modification of equipment is contracted out to original equipment manufacturers. On the other hand, R&D has increased from approximately 300 to 500-550 during the past four or five years. Two factors appear responsible for this increase. The movement of some of the Engineering staff to R&D (Process R&D) and that RJR has increased basic research.

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GENERAL COMMENTS CONCERNING RJR RESEARCH AND DEVELOPMENT

- Maintaining top quality and product innovation are major strategic objectives of the Company—in the 1980's.
- There is dissatisfaction with the Nabisco management style in the tobacco business. However, the R&D Department has, in general, had high morale. They have worked in task-oriented programs in multidiscipline groups with very competent technical people.
- The labs are well equipped with state-of-the-art equipment. They apparently aggressively pursue new technology in the instrumentation area.
- Small (1-liter) supercritical CO₂ systems have been seen in the laboratories.
- All of the labs are open and multifunctional, with offices around the outside.
- Their university contacts are good in areas of chromatography, spectroscopy, aerosol physics, and more recently neutron radiography (University of Michigan).
- John Clendenin, the CEO of Bell South and a member of the Board of RJR Nabisco, is a very knowledgeable scientist who pushes new technology.
- John D. Macomber, former Chairman and CEO of Celanese Corporation, was also a member of the Board of RJR Nabisco as well as being Vice Chairman of the Executive Committee. He recently left Celanese as a result of the Hoechst takeover. It has recently been announced that he will become Chairman of Lasertechnics Inc., a small Albuquerque, N.M., company that makes laser systems for industrial and medical applications.
- At a recent optical processing meeting, RJR sent 20 technical people (PM had 2).
- The RJR Agronomy Group in R&D has been moved to Laboratory Administration.
- RJR has aggressively sought new people in health related areas of research such as toxicology and electrophysiology research. (These groups may be in Corporate Research and not RJR R&D.)

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- Recent information (unconfirmed) indicates that the Fundamental Research Directorate is being combined with the Applied Research Directorate under Dr. Mary Stowe, the Director of Applied Research, who will become the Director of Research.
- RJR lost 90 people in R&D to early retirement this year. Word is that they will be replacing all of the retirees with no reduction in head count.
- The head count at RJR R&D has been quoted by various sources at between 500 and 800 people. If it is compared on an equal basis with PM (Leaf, Engineering and Extramural Activities removed), it is estimated that RJR has slightly less people in R&D (500) than PM. For instance, in 1983 a research publication gave the following comparison:

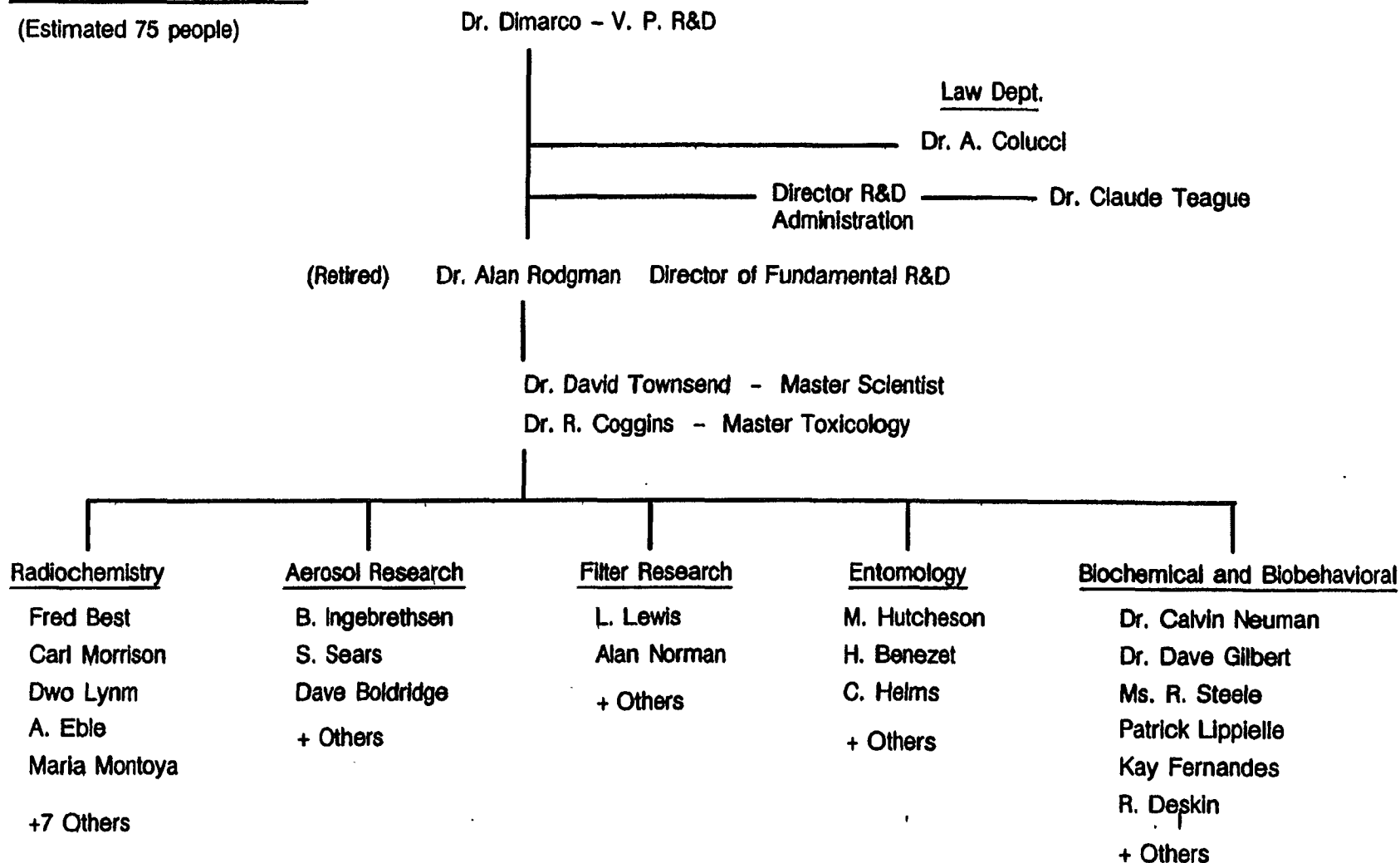
| RJR (1983) | PM (1983) |
|------------------------|-------------------|
| Bowman Grey Tech. Ctr. | Research Center |
| Ph.D - 46 | Ph.D - 73 |
| Prof. Staff - 297 | Prof. Staff - 354 |
| Technicians & | Technicians & |
| Support - 233 | Support - 225 |
| Total - 530 | Total 579 |

- What follows is an attempt to create the RJR R&D organization chart from publications, meeting attendance and private communication with PM people. Also included (see page 27) is a listing of all the inventors listed on RJR's "smokeless cigarette" patents. It should be noted that most of these individuals are not shown elsewhere on the charts.

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Fundamental R&D*

(Estimated 75 people)

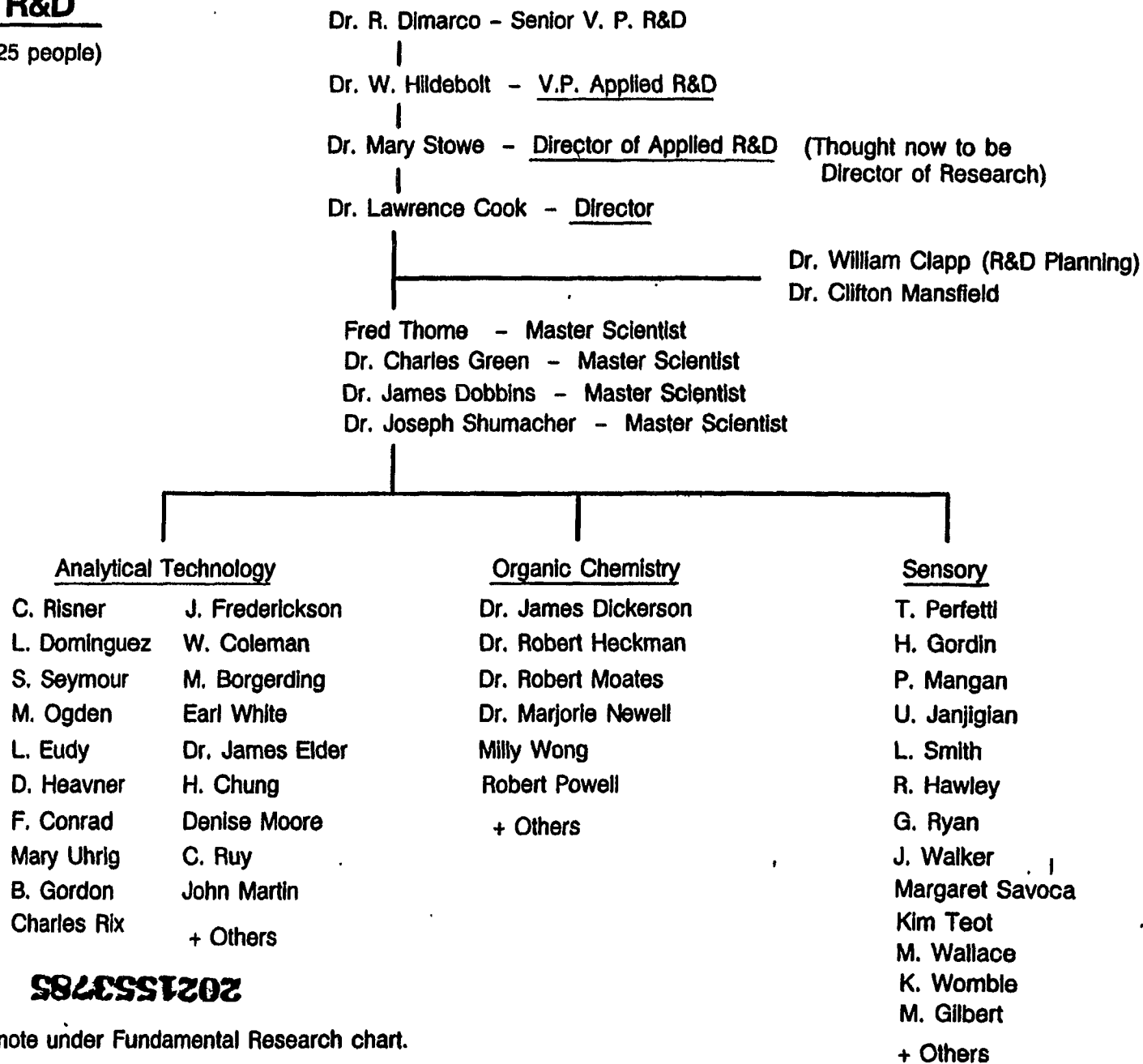


* Unconfirmed Information Indicates this Directorate will be merged with Applied Research with the new Directorate called the Research Directorate.

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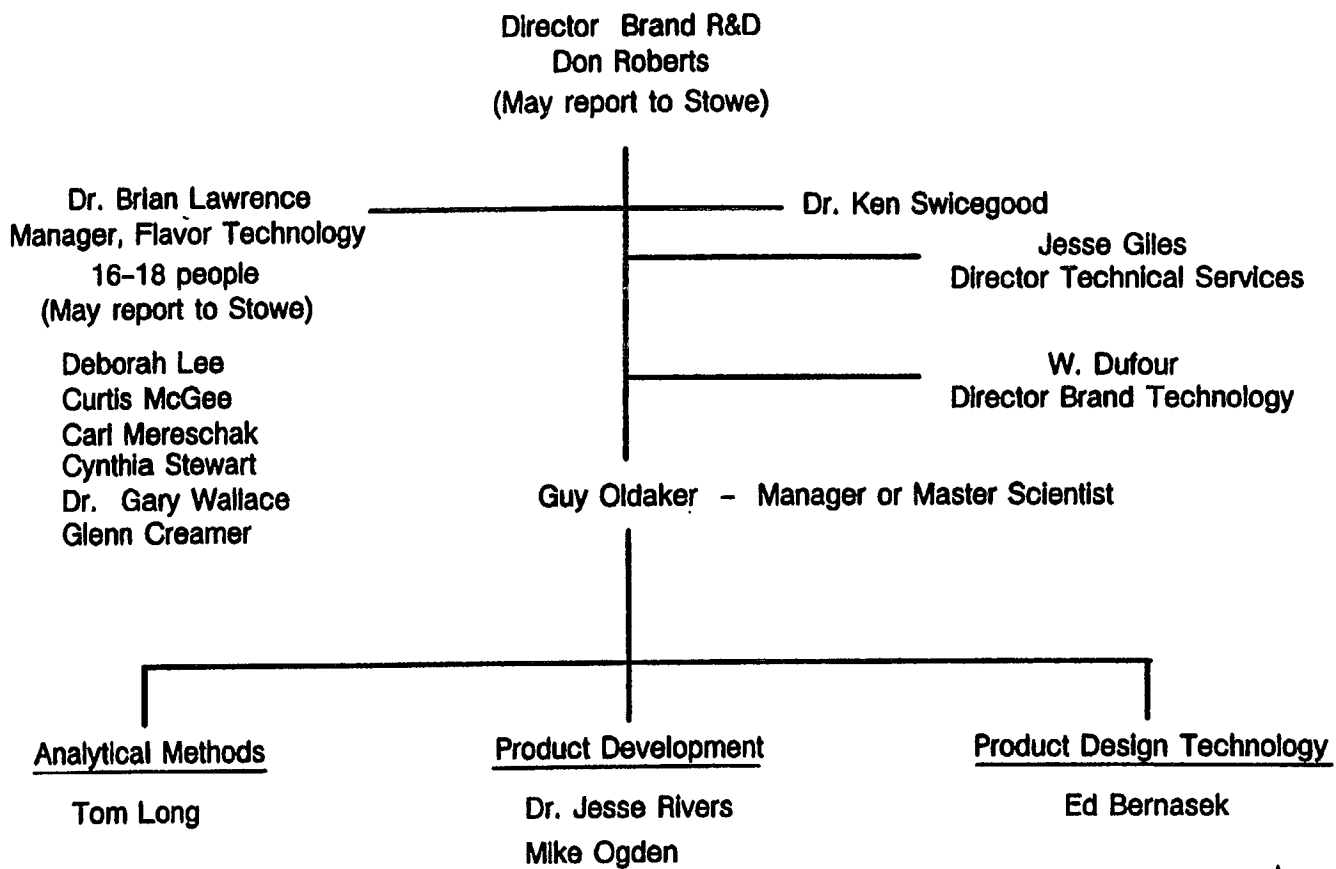
Applied R&D *

(Estimated 125 people)



* See note under Fundamental Research chart.

Brand R&D



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Process R&D

(Estimated 100 people)

Thomas H. Lowe - Director (Retired)



```
graph TD; A[Thomas H. Lowe - Director (Retired)] --> B[Don Calleson  
Ernest S. Farrier];
```

Don Calleson
Ernest S. Farrier

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Agricultural Programs

Layton Davis

Agronomy

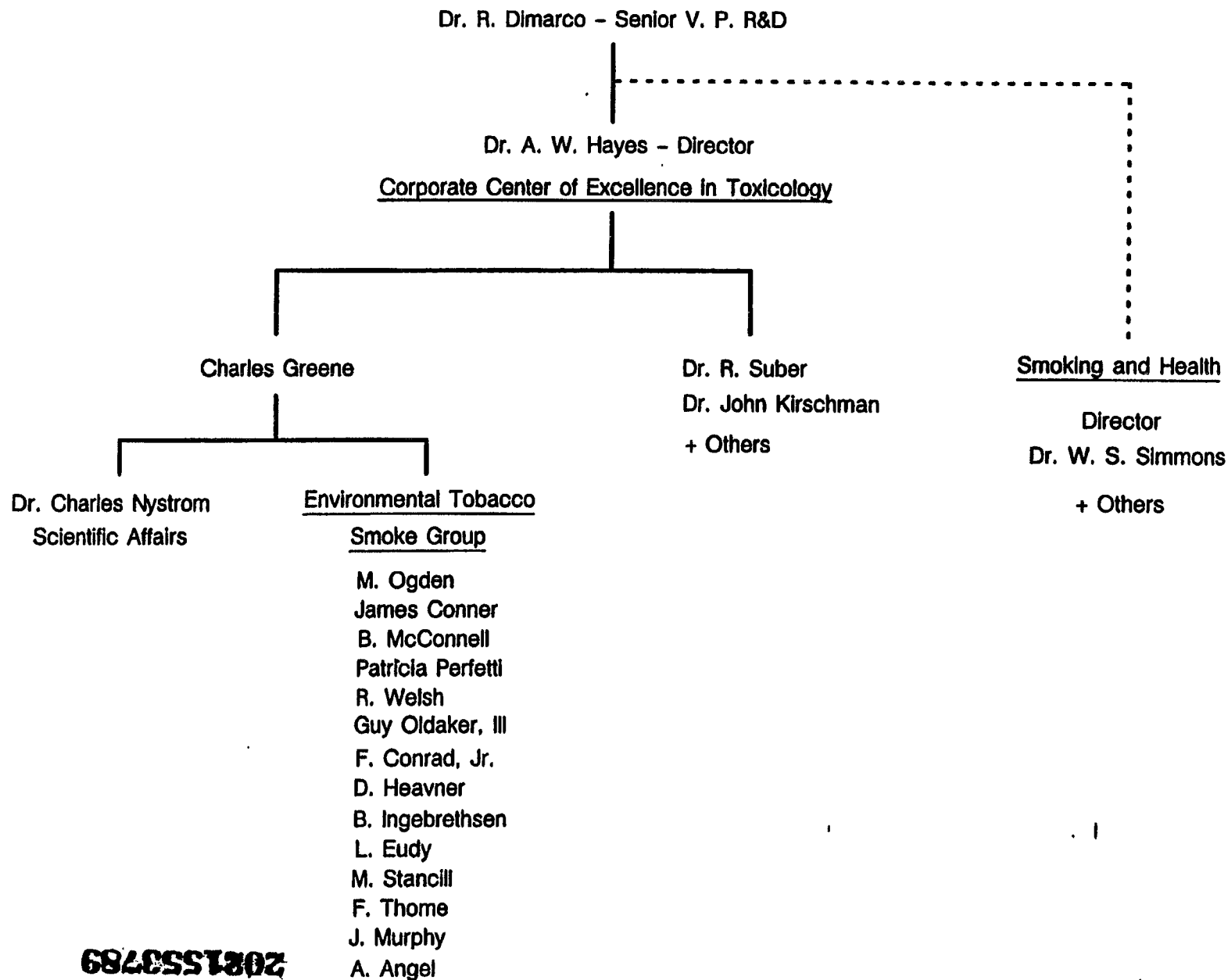
(Now thought to be under
Administrative Services)
(They spend much time
in China.)

Brian Smeeton
Kenneth Bridle
D. Peel
Larry McLawhorn
Jim Arnett
+2 Others

Leaf

Arnold Mitchem
Richard Reich
Carroll Miller
J. D. Rogers
+ Others

884C551202



**PM USA COMPETITORS' ESTIMATED
R&D BUDGETS FOR 1985**

| <u>Company</u> | <u>1985 R&D Budget</u> | <u>1986 Budget</u> |
|----------------|----------------------------|--------------------|
| PM* | \$69 million | \$72 million |
| RJR Nabisco | \$50-60 million | \$61-73 million |
| B&W | \$20-25 million | NA |
| Lorillard | \$12-25 million | NA |
| American | \$10-23 million | NA |
| Liggett | NA | NA |

*For PM and RJR Nabisco the R&D budgets are compared on the same basis. RJR is thought to include Process Engineering (Burnley function), part of the Leaf Department, and Extramural Affairs as part of their budget. The PM number was arrived at as follows:

| | |
|--------------------------|--------------|
| PM R&D USA Domestic | \$54 million |
| Consultants | \$6 million |
| Contributions | \$6 million |
| Process and Product Eng. | \$10 million |
| Leaf Programs | \$1 million |
| Tobacco Inventory Adj. | -\$5 million |
| Total | \$72 million |

The above breakout does not include international PM USA R&D expenditures, since the RJR R&D budget is for domestic expenditures only.

NOTE: The competitors' budgets are estimated from published financial data.

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RJR INVENTORS
"SMOKELESS CIGARETTE"

Banerjee, Chandra Kumar
Farrier, Ernest Gilbert
Harris, James Luther
Ingebrethsen, B. J.
Jakob, Stephen Walter
Norman, Alan Benson
Pryor, J. W.
Raker, Mary Lindsay
Resce, James Lee
Reynolds IV, John Hughes
Ridings, Henry Thomas
Sensabaugh, Andrew Jackson
Shannon, Michael David
Shelar, Gary R.
Stowe, Mary E.
White, Jackie Lee
Woods, Donna Kimes

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**COMPARISON OF RJR R&D AND PM R&D
IN THEIR IMPACT ON THE MARKETPLACE**

The reason that any large company carries out a research and development activity is to protect the company's products and processes from technical obsolescence and to develop new products to maintain company growth. Obviously Philip Morris has grown tremendously since 1960 in coming from Number 6 in the industry to Number 1 (Figure 1). This growth was largely due to the marketing success of Marlboro, Benson and Hedges, Virginia Slims, and the development in R&D of the Merit family.

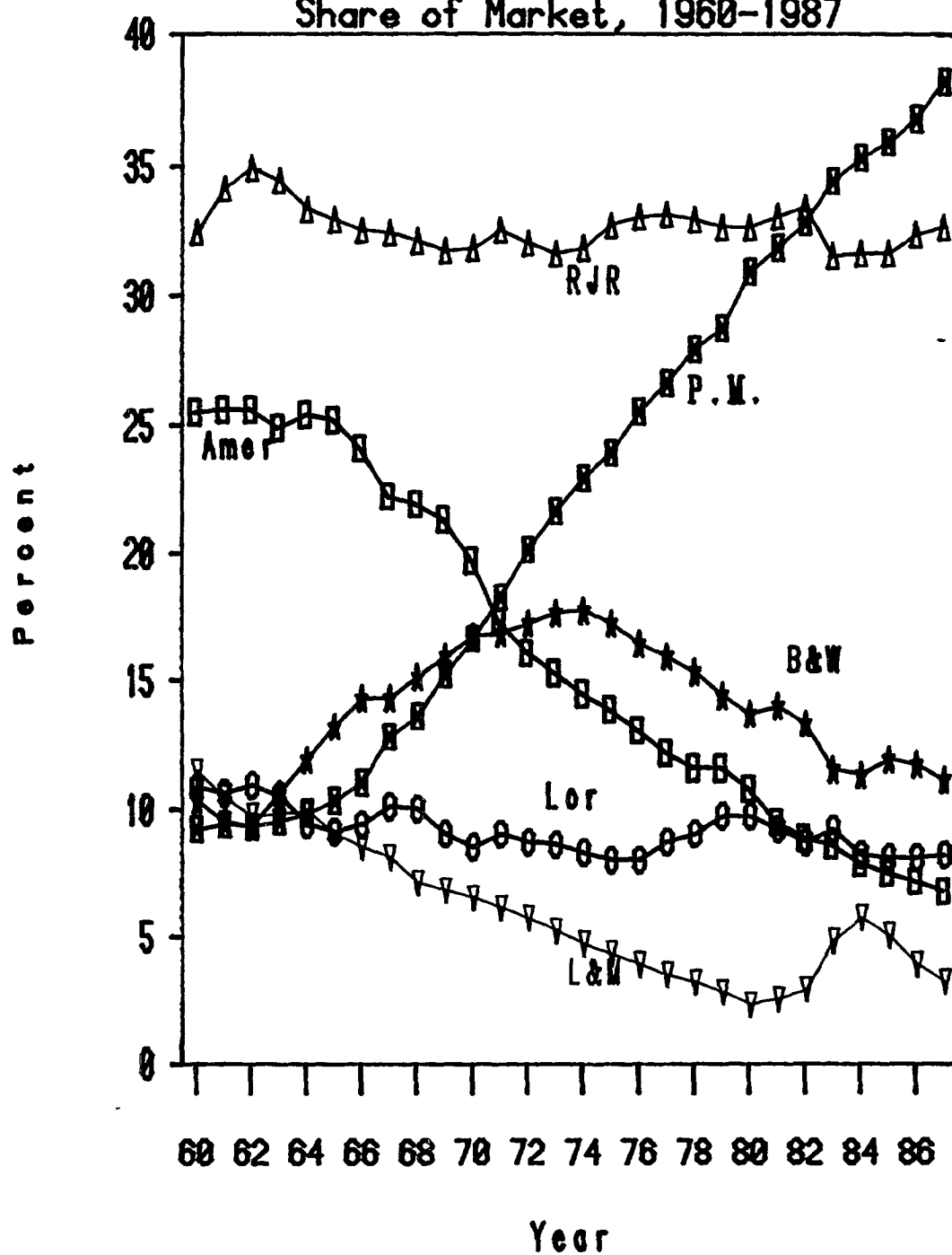
For this exercise the two companies are compared in the 1982-1987 time frame. In Figure 2, comparing sales of new and existing brands from 1982-1987, it can be seen that the new brand sales are approximately equal. However, RJR did not protect their existing brand sales and as a result PM showed moderate volume growth in that time period while RJR suffered significant volume loss in the same time.

In addition, if one looks at only the incremental new brand sales over that time period, it can be seen that while the volume is essentially equal, PM was introducing full margin products while RJR was introducing price value products. Figure 3 shows the brand sales by year of introduction, and Figure 4 shows the price value versus full price ratios of those brands. Full margin brands require greater R&D innovation and resources than price-value brands.

The mix of new product brands for the two companies--that is, PM has introduced full margin brands while RJR has gone to a price value strategy--has a large impact on both sales dollars and the marginal contribution. Although we believe that PM's margins are slightly better than RJR's, for this presentation we assumed both margins to be equal. For instance, Figure 5 shows the gross sales dollars of the new brand introductions and it can be seen that PM does considerably better than RJR. Figure 6 shows the marginal contribution in which PM does even better because of the price value component at RJR. Finally, Figure 7 gives a comparison of both new brands sales dollars and marginal contribution in the period 1982-1987. In addition, PM has continued to produce new brands that take more heavily from RJR than they cannibalize our own brands. This information is detailed in Table 16 and Figure 8 and again shows more product innovation than RJR has shown. Finally, to complete the picture Figure 9 shows the PM exports, and the exponential growth since 1985, compared to the rest of the tobacco industry. It is this area of the business that will provide great opportunities for PM in the next few years. R&D must continue to support and capitalize on these opportunities aggressively with unique and innovative new products.

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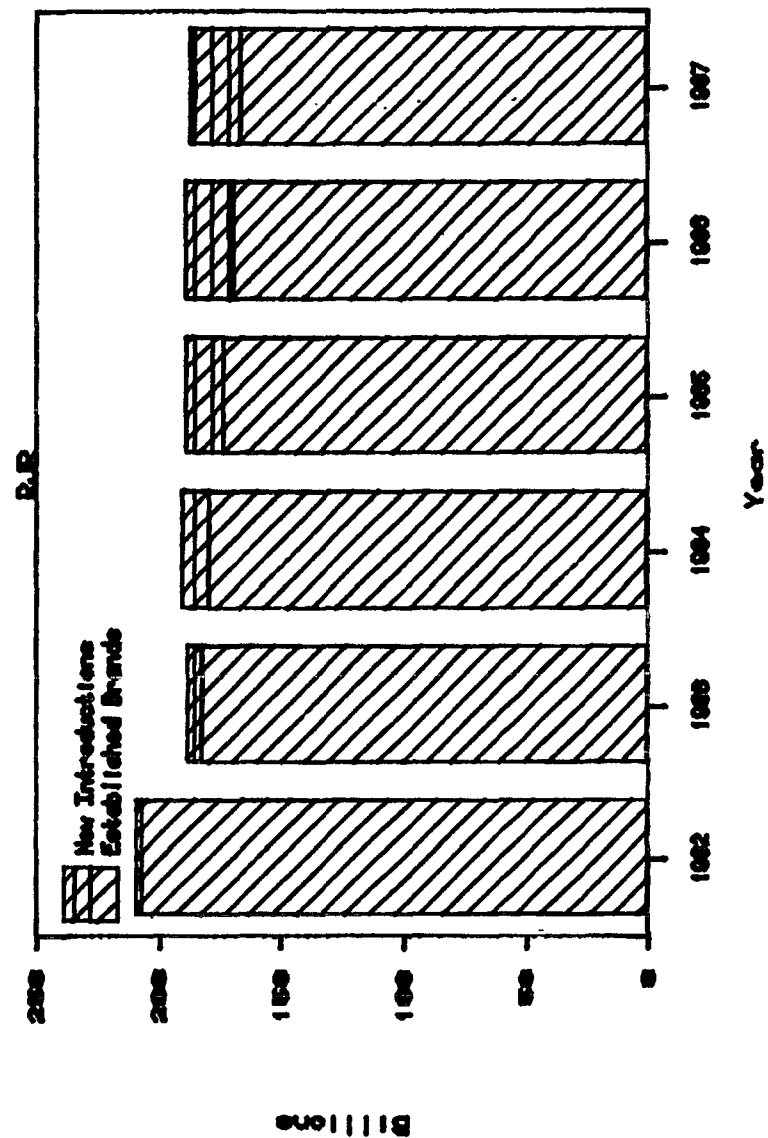
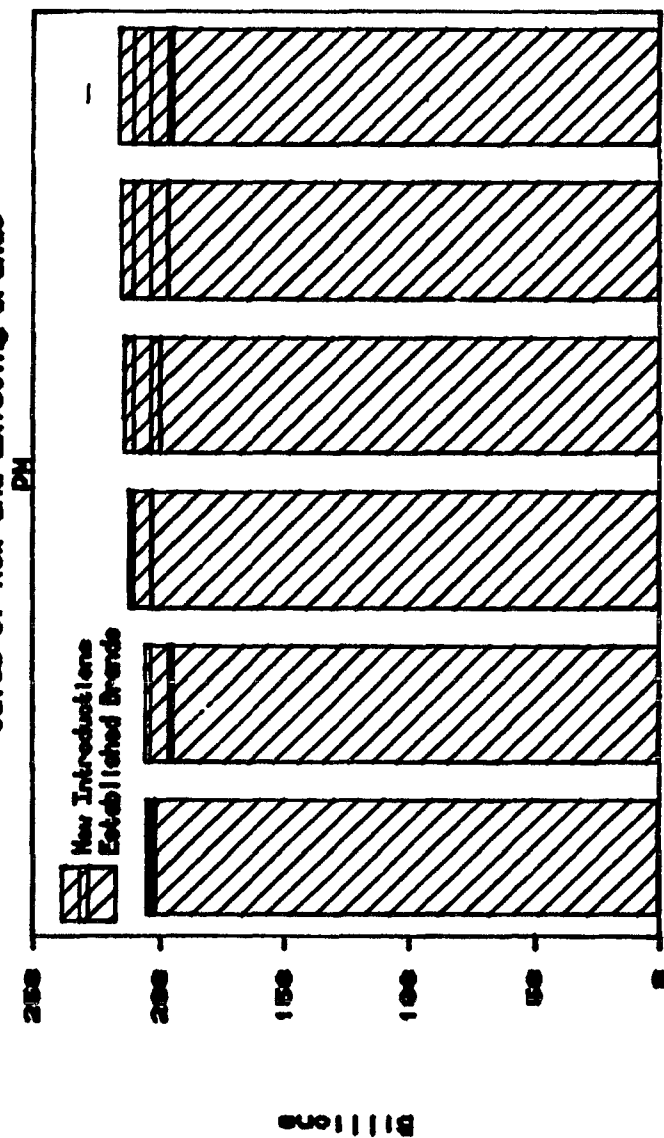
Figure 1
Share of Market, 1960-1987



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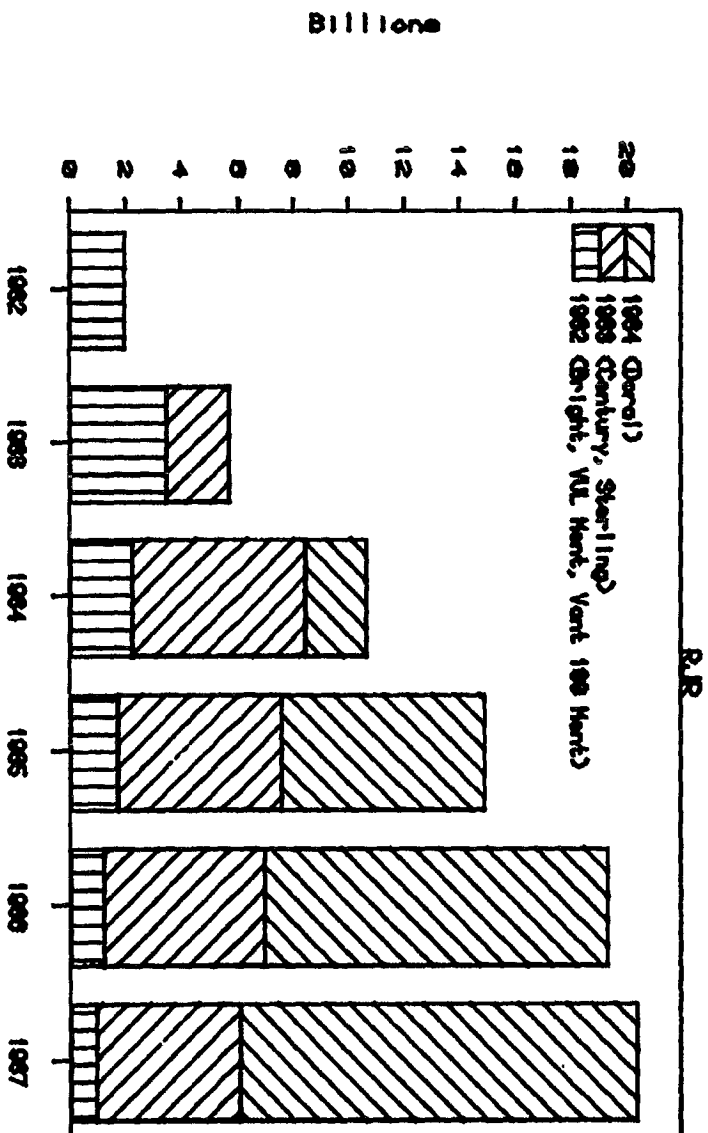
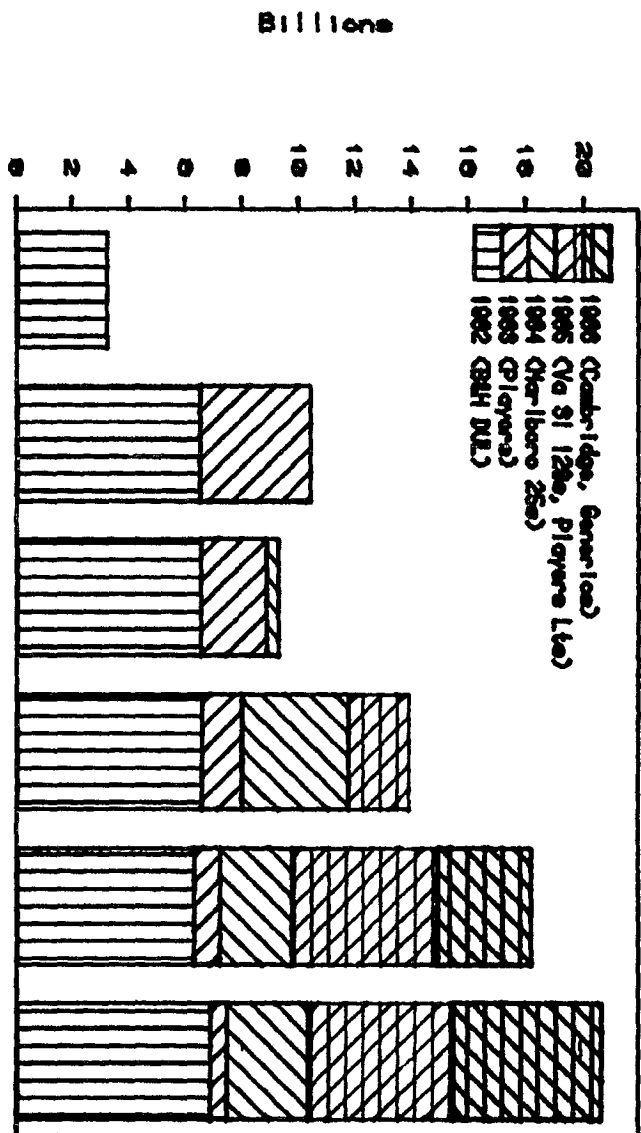
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Figure 2
Sales of New and Existing Brands



Source: Howell Reports, HED (1987)

Figure 3
Incremental Sales of Brands by Year of Introduction
PH

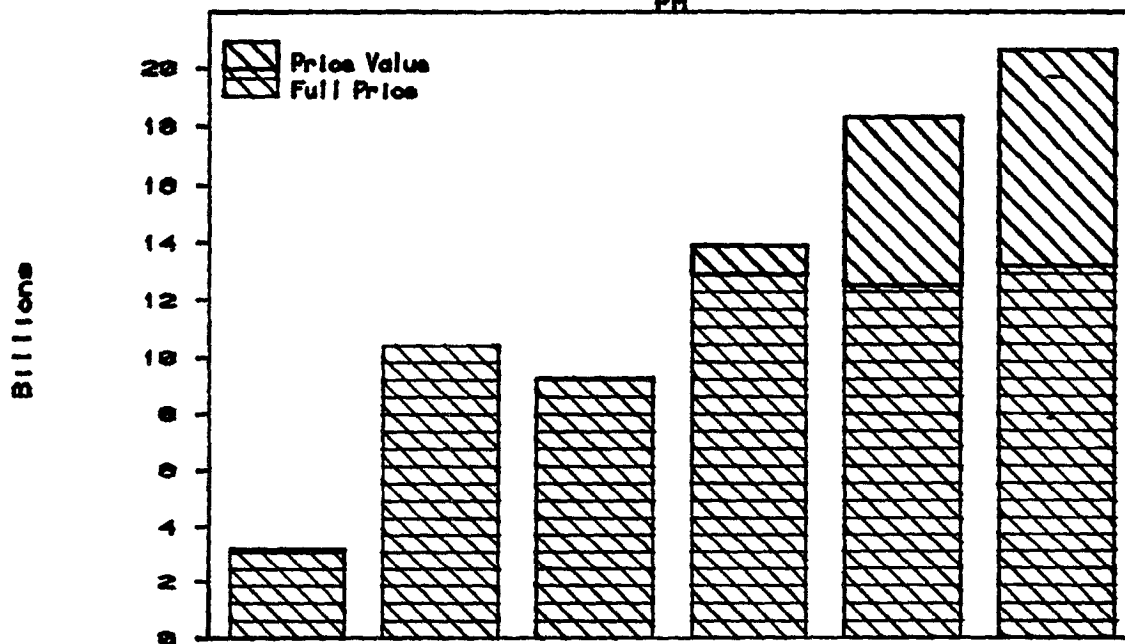


Source: Hamell Reports, HRO (1987)

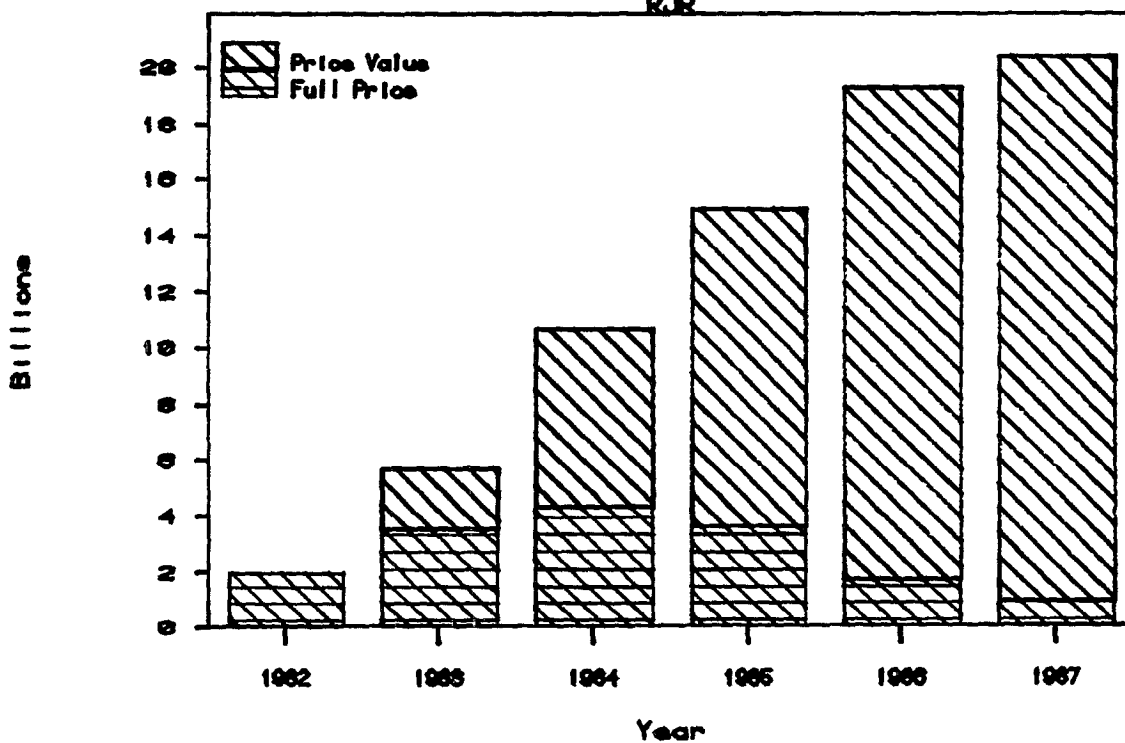
Figure 4

Sales of Brands Introduced Since 1981

PM



RJR

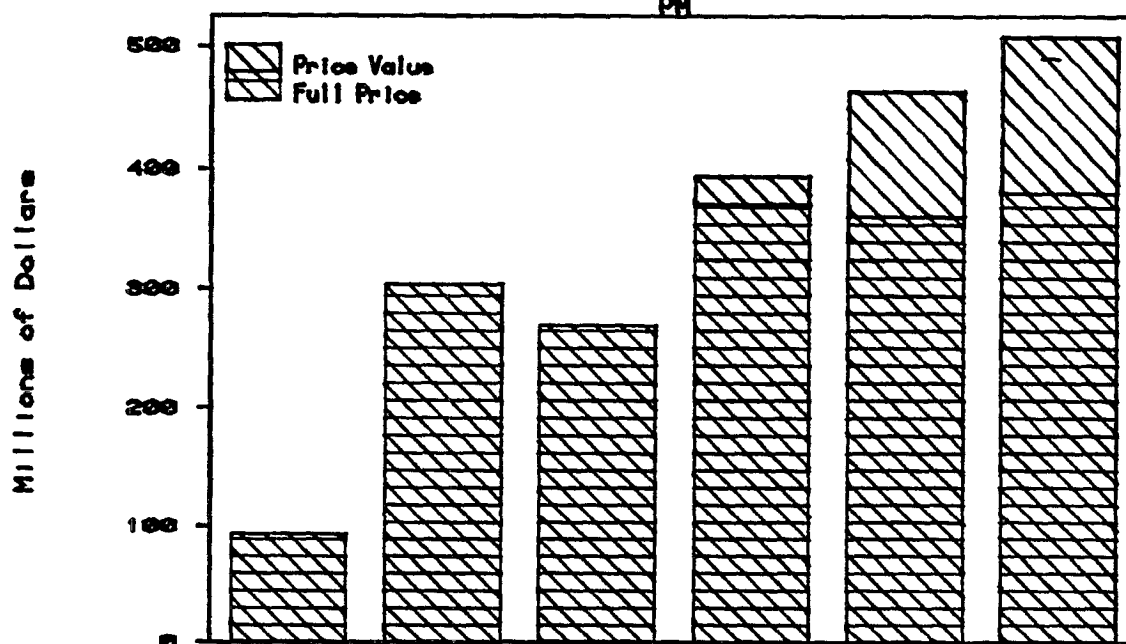


Source: Maxwell Reports, MFD (1987)

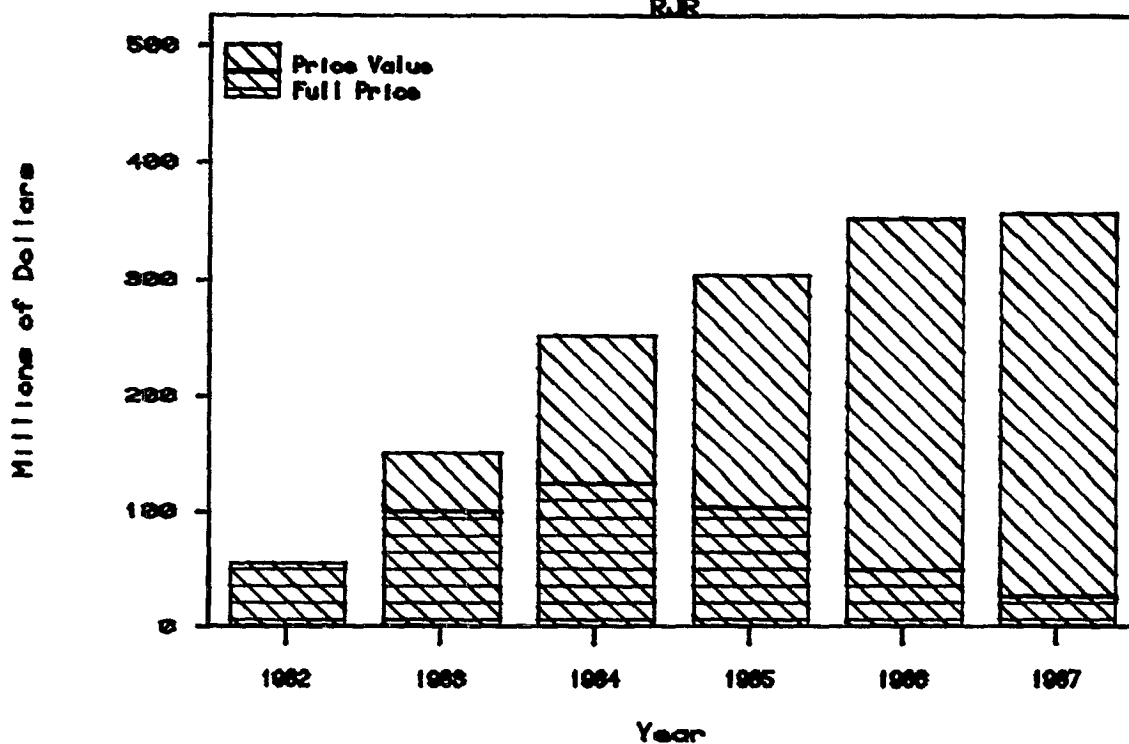
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Figure 5

Sales (1986 prices, ex. tax) of Brands Introduced Since 1981
PM



R.R.

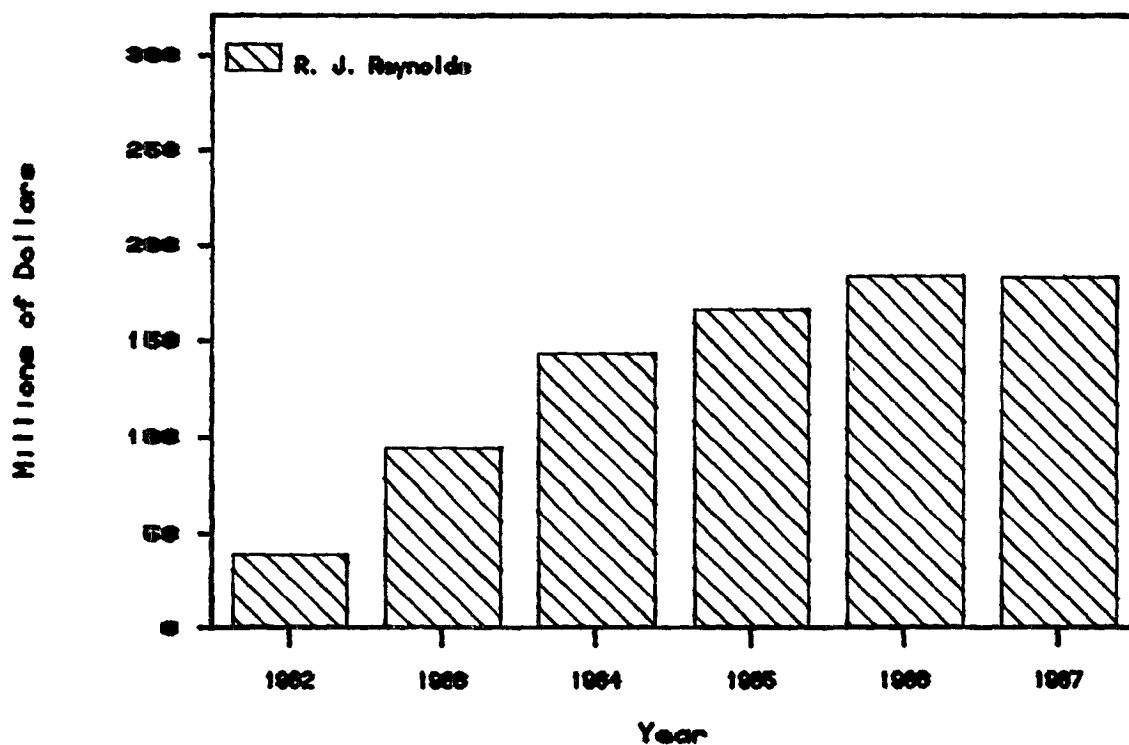
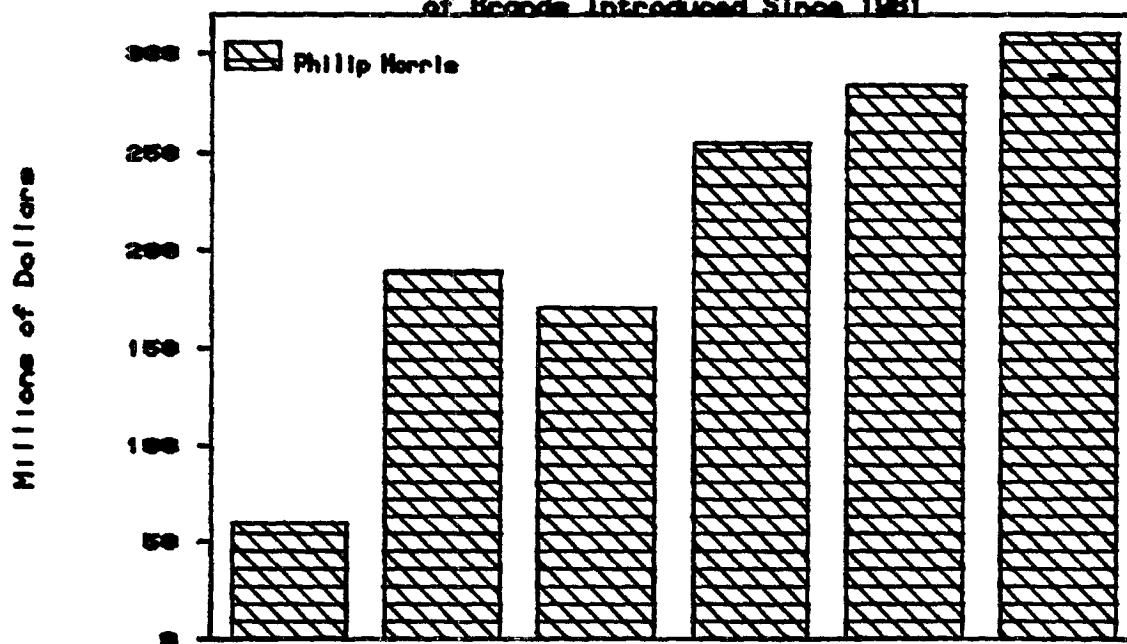


Source: Maxwell Reports, MRD (1987)

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Figure 6

Marginal Contribution (Constant Dollars)
of Brands Introduced Since 1981

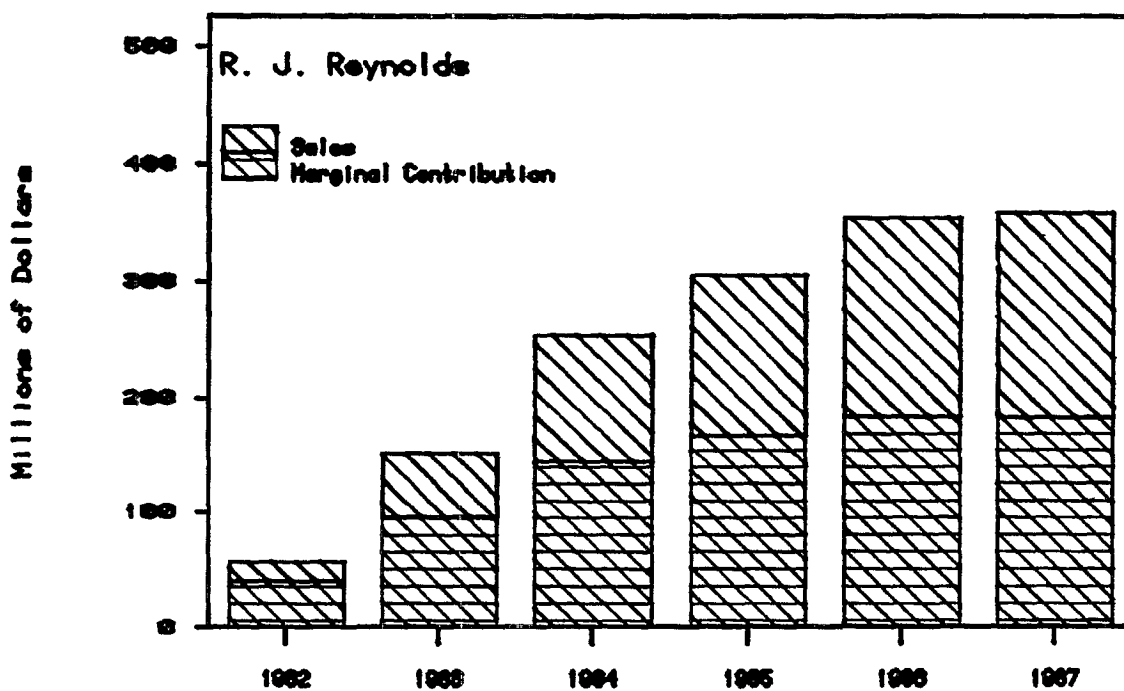
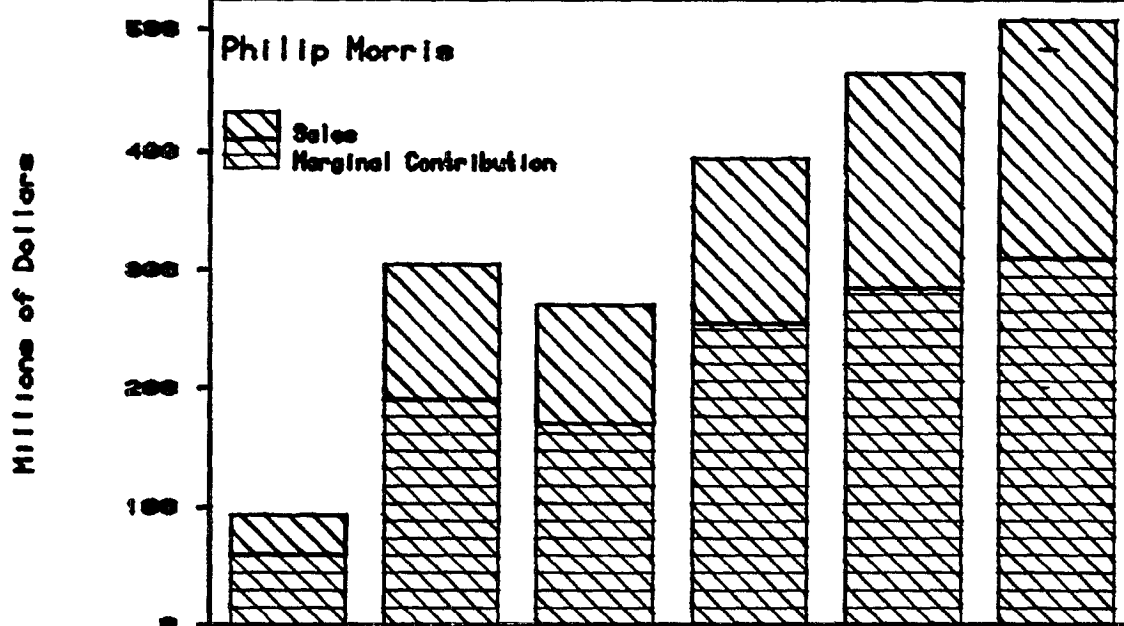


Source: Merrill Reports, Finance, NRD (1987)

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Figure 7

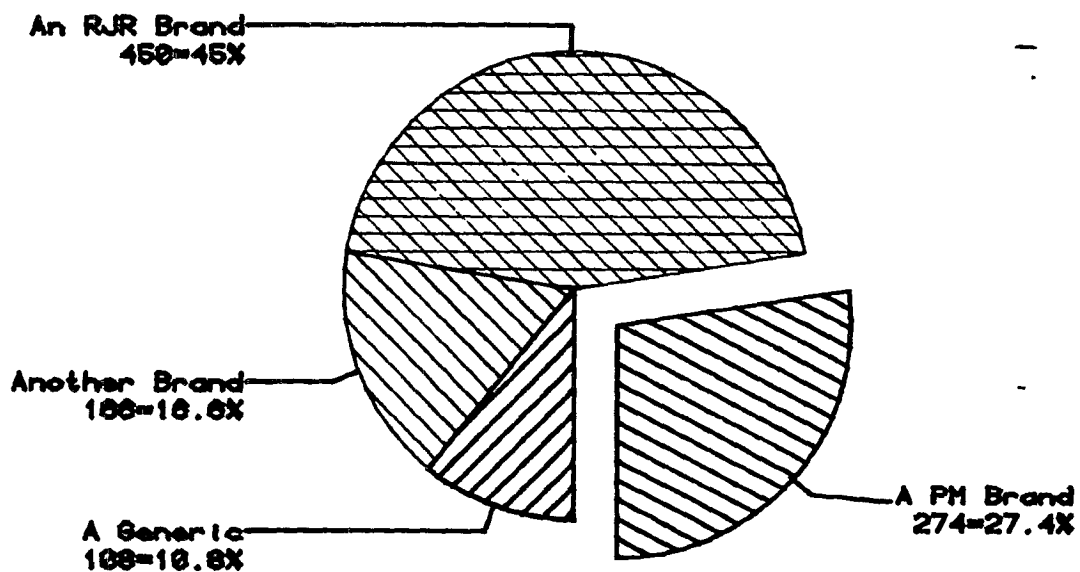
Sales and Marginal Contribution
(Constant Dollars ex. tax) of Brands Introduced Since 1981



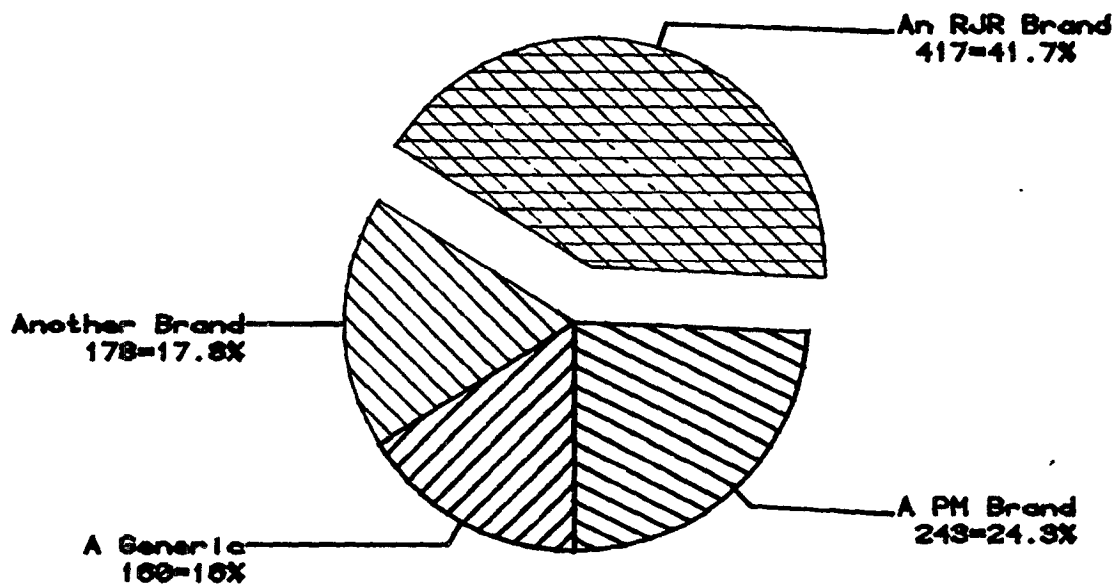
Year
Source: Maxwell Reports, Finance, HRD (1987)

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Figure 8
Sources of Consumers of New PM Brands



Sources of Consumers of New RJR Brands



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TABLE 16
SOURCE OF SMOKERS OF PM AND RJR BRANDS
INTRODUCED SINCE 1981

| <u>Current Brand</u> | <u>Previous Brand Was</u> | | | <u>N*</u> |
|------------------------------|---------------------------|---------------------|--------------|-----------|
| | <u>A PM Brand</u> | <u>An RJR Brand</u> | <u>Other</u> | |
| B&H DeLuxe Ultra Light | 38.0 | 44.6 | 17.4 | 92 |
| Virginia Slims 120s | 32.9 | 42.4 | 24.7 | 170 |
| Players Lights | 27.0 | 44.9 | 28.1 | 263 |
| Cambridge | 22.8 | 47.0 | 30.2 | 474 |
| Marlboro 25s & Lights 25s | | (Sample too small) | | |
| Players Box | | (Sample too small) | | |
| Total New PM Brands | 27.0 | 45.4 | 27.5 | 1012 |
| Doral | 26.8 | 36.7 | 36.5 | 690 |
| Century | 21.0 | 48.6 | 30.5 | 558 |
| Bright & Vantage Menthol | 31.2 | 34.4 | 37.5 | 32 |
| Vantage Ultra Lts Menthol | | (Discontinued) | | |
| Sterling | | (Discontinued) | | |
| Total New RJR Brands | 24.4 | 41.8 | 33.9 | 1280 |

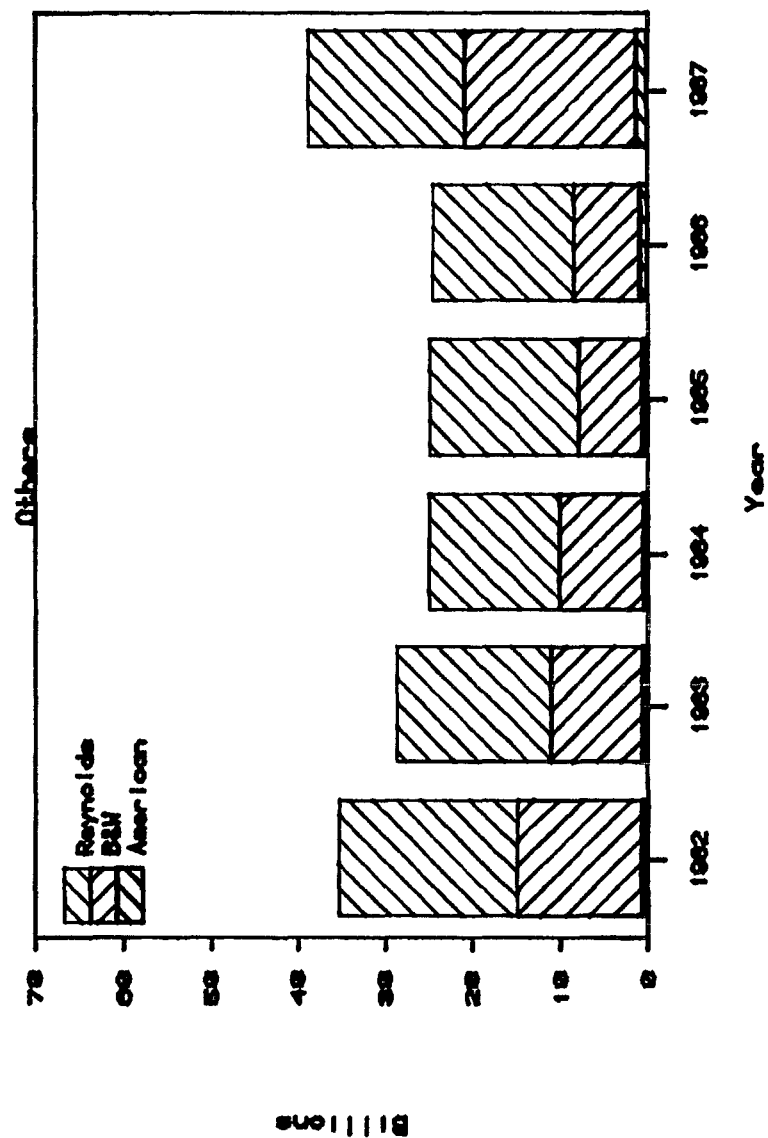
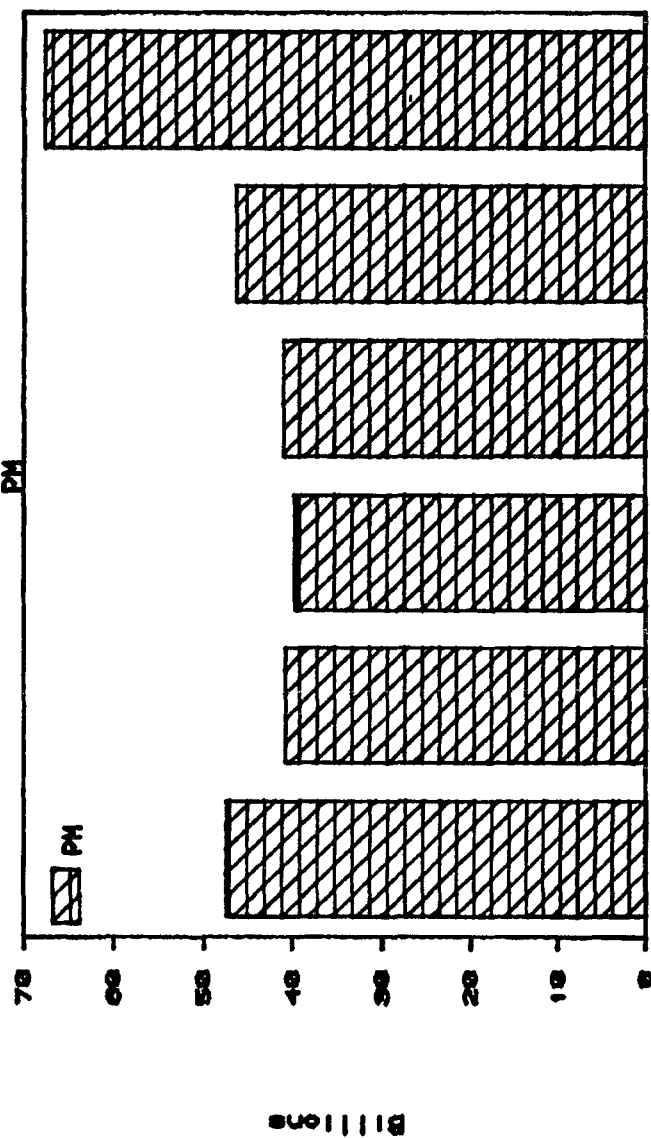
Thus all of our new brand introductions are drawing more heavily from RJR than from our brands. Surprisingly, this is true even of DUL and Slims 120s, which should cannibalize the parent brands. The reason PM is not losing many smokers to RJR brands is that their only successful entries have been price-value brands, and the smokers of these brands have demographics similar to those of other RJR brands and vastly different from smokers of PM brands. The switching from "Other" into Cambridge, Players Lights, Doral, and Century is largely smokers who previously smoked a plain pack generic.

*These data are based on 4637 people who smoked one of these brands at the time of the 1986-1987 repolling of the POL panel, of whom almost exactly half (2292) had switched brands between the 1985-1986 and 1986-1987 repollings of the panels. (See Figure 8.)

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Figure 9

Exports



Source: Maxwell Reports, Commerce Dept.

SUMMARY
OF RJR-PM RESEARCH AND DEVELOPMENT COMPARISON

1. RJR R&D IS ORGANIZED IN A SIMILAR WAY TO PM BUT CONTAINS PART OF A LEAF FUNCTION, AN ENGINEERING FUNCTION, AND POSSIBLY AN EXTRAMURAL AFFAIRS FUNCTION.
2. COMPARED ON THE CORRECT BASIS, PM PROBABLY STILL IS SLIGHTLY LARGER IN HEAD COUNT THAN RJR (560 TO 500).
3. RJR'S TECHNICAL GROWTH HAS BEEN LARGELY IN HEALTH-RELATED DISCIPLINES.
4. MORALE IN RJR R&D HAS BEEN HIGH BUT IS DROPPING LATELY DUE TO CONFLICTS FROM NABISCO ON HOW TO MANAGE BUSINESS.
5. . THERE IS A CORPORATE R&D STRUCTURE AT RJR NABISCO (JOHN MASELLI) WHICH LINKS THE RJR R&D LAB TO THE NABISCO R&D LAB.
6. PM OPERATIONS HAVE BEEN MUCH MORE SUCCESSFUL IN THE PERIOD 1982-1987 IN PROTECTING THE CURRENT BUSINESS, IN PRODUCING FULL MARGIN NEW PRODUCTS, AND IN PRODUCING NEW EXPORT PRODUCTS THAN RJR AND THE REST OF THE INDUSTRY.

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**R&D STRATEGIC PLAN
SUMMARY**

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R&D STRATEGIC PLAN**SUMMARY**

The Five-Year R&D Strategic Plan analyzes the current program objectives and resource allocations, the internal strengths of R&D, the internal weaknesses of R&D, the competition, and the external opportunities which R&D can take advantage of. These opportunities are:

- . **HEALTH PRODUCTS**
- . **INTERNATIONAL MARKETS**
- . **MENTHOL PRODUCTS**
- . **ETHNIC MARKETS**
- . **ENVIRONMENTAL TOBACCO SMOKE**
- . **NEW TECHNOLOGY IN MANUFACTURING**
- . **PRODUCTS FOR FORMER SMOKERS**

After the complete situational analysis, a set of six strategic goals was generated.

1. **AGGRESSIVELY SUPPORT THE CURRENT BUSINESS.**
2. **DEVELOP PRODUCTS WHICH ADDRESS THE CONSUMERS' DESIRE TO REDUCE THEIR HEALTH CONCERNS**
3. **DEVELOP PRODUCTS WHICH ADDRESS THE PUBLIC'S DESIRE TO REDUCE ENVIRONMENTAL TOBACCO SMOKE.**
4. **DEVELOP NEW PRODUCTS WHICH CAN BE MARKETING USING CURRENT STRATEGIES AND GIVE SMOKERS A PRODUCT ADVANTAGE.**
5. **IDENTIFY PRODUCT/PROCESS CONCEPTS AND DEVELOP PRODUCTS/PROCESSES FOR THE INTERNATIONAL MARKET.**
6. **PROVIDE A BROAD FOUNDATION OF BASIC RESEARCH THAT WILL GENERATE NEW PRODUCT CONCEPTS IN 5-15 YEARS.**

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In addition, the following R&D internal strategies were developed:

- . Increase the laboratory "quality" by transfers of key people to new areas and by advanced training of selected people designed so as to technically broaden the staff by the influx of "new blood" by outside hiring and by an increased turnover rate.
- . Place more emphasis on basic research so as to have the knowledge base to grow the business in the 5-15 year range. This means some reduction of short-term support activities.
- . Aggressively seek new technology, most of which will be done externally through universities and small companies.

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ADDENDUM

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DELTA ADDENDUM

INTRODUCTION

On Monday, September 14, 1987, RJR Nabisco announced the development of a smokeless cigarette. Based on information derived from their announcement, the device utilizes the combustion of a carbon rod as a heat source; the heat from the carbon is used to volatilize glycerine, nicotine and flavors which are contained in an aluminum flavor capsule; the volatile components mentioned above are adsorbed on to zeolite adsorbants; the nicotine and flavors are provided by a combination of tobacco extract and proprietary flavors; the flavor capsule is contained in a bed of tobacco; and the carbon is wrapped with an insulator. The volatiles produced are filtered by both a "tobacco filter" and a conventional filter.

A number of claims were made for this article. The first is that it would provide virtually no sidestream smoke. The second is that it would not ignite any surface in which the cigarette was placed. The last was that the article did not burn tobacco; therefore, there were many fewer compounds in the mainstream smoke than from a conventional cigarette. The TPM from the cigarette (about 12 mg) contained about 1 mg of nicotine; and 90% of the remainder was glycerine and water. (The purpose of the glycerine is to provide an aerosol which resembles smoke.) Although they did not explicitly state that this device was safer than a conventional cigarette, the implication was certainly there. They did indicate that the mainstream smoke contains both nicotine and carbon monoxide.

HISTORY

The concept of using a heat source to produce tobacco flavors via pyrolysis as opposed to the combustion of tobacco is hardly new. Many patents exist describing various executions of this concept. In addition, a project was initiated at Philip Morris R&D in 1975 to develop a product which was based on this technology. The original concept of Project Delta, as it was named, was to deliver tobacco flavor using the combustion of carbon as a heat source, and a totally artificial flavor mixture to provide tobacco flavor. Although a carbon source was developed which fit the requirements of this product, success in providing good tobacco flavor without using tobacco was not achieved after several years of research. Consequently, in 1982 it was decided to scale back the effort on this program, and to investigate the development of products with non-combustible heat sources; e.g., the electric cigarette. Several patents relating to the original objectives of Project Delta were filed, however.

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While the R&D Strategic Plan was being written, it was recognized that the introduction of a radical new competitive product was a distinct possibility. To quote directly from the Plan, "One of the advantages of the cigarette business is that products have long life cycles, and technical obsolescence of the product rarely occurs. However, product changes have occurred in the past; for example, the filter cigarette. Companies which adopted the attitude that the filter cigarette was simply a fad paid dearly for this error. It is quite possible that within the next ten years new developments as revolutionary as the filter cigarette will change our current product. Some possible developments are a non-burning article, a different delivery system for nicotine..." In addition, the Plan also indicates, as does the New York Five-Year Plan, that our competitors are likely to make a desperate move in order to turn the tide of consistently eroding market share.

The Strategic Plan addressed the possibility of facing a radical competitive product by suggesting that research be devoted to the development of a non-burning article (Strategic Goal No. 1) and basic research be devoted to the areas of filtration, flavor and natural products, aerosol formation and altering burn characteristics of tobacco (Strategic Goal No. 6). All of these basic research objectives contribute to the optimum design of a device which provides tobacco flavor but does not burn tobacco. Despite anticipating this possibility, however, we were certainly not prepared for the RJR announcement which came only one week from the completion of the first draft of the R&D Strategic Plan. As a consequence, our immediate goal must be to meet the RJR challenge head on.

STATUS

In order to best solve the problems inherent in developing a device which will provide tobacco flavor without burning tobacco, it was necessary to subdivide the program in order to make it manageable. The device was divided into two parts--the front end containing the carbon heat source and the flavor generator, and the back end containing the tobacco (or tobacco substitute) and filter. Since the back end resembles a conventional cigarette, most of the effort to date has concerned itself with the front end. Five distinct components have to be addressed in order to develop the front end; namely, the carbon heat source, the insulator, the flavor chamber, the form of the tobacco to be placed in the flavor chamber, and the required flavors. Work is ongoing on all of these components simultaneously. In addition, the device must be able to be assembled at high speeds; therefore, close collaboration with the Engineering Department is necessary. The present status of each one of these items will be discussed below.

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Carbon

Considerable work had previously been carried out with respect to the development of a carbon heat source as was indicated above. Consequently progress on this item has been reasonably rapid. The requirements for a usable heat source are that it must burn freely, it must be low in ash, it must contain no nitrogen, and it must provide a constant heat profile during ten puffs. We are working with two outside suppliers for the carbon heat source; namely, Stackpole in St. Marys, Pennsylvania, and the Westvaco Corporation in Covington, Virginia. We have received numerous samples from Stackpole, and a large number of samples from Westvaco will be received the second week of November. Samples on hand burn freely and give good heating profiles; however, further work needs to be carried out on obtaining purer samples.

Insulator

The requirements of the insulator are that it be sufficiently porous to weigh no more than 500 mg. (the total weight of the article must be less than 1.36 g in order to avoid a higher excise tax), it must have low conductivity and low heat capacity, and it must be sufficiently rigid to survive the assembly of the front end. Although we are working with a number of different suppliers, we have yet to obtain an insulator which satisfies all of the above criteria. We do have, however, insulators which can be used to evaluate hand made models.

Flavor Chamber

Our original plans called for the use of an aluminum flavor chamber which would contain adsorbants impregnated with glycerine, water and flavors. The purpose of the glycerine and water is to provide an aerosol. Nicotine and some tobacco flavors were to be swept from tobacco placed behind the flavor chamber by the glycerine water aerosol. Research has indicated that the aerosol provides insufficient heat to remove nicotine from tobacco placed behind the flavor chamber, and that nicotine can best be provided to mainstream smoke by placing the tobacco in the flavor chamber. In addition, it appears that a separate aluminum can is unnecessary, and that the tobacco can simply be placed in the insulator.

Tobacco

Having determined that tobacco should be placed in the "flavor chamber", it was necessary to determine the form of that tobacco. The "flavor chamber", in addition to containing tobacco, must also contain a solid adsorbant which is impregnated with either glycerine or propylene glycol to provide an aerosol. We have investigated a number of adsorbants, and have obtained the best results to date with

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alumina. The ideal solution to the problems which would be encountered by trying to introduce a mixture of alumina granules and cut filler is to co-extrude the tobacco and the alumina so that a homogeneous material is obtained. We are still investigating whether the extrudate should be in the form of pellets or a plug with lateral holes running through the plug.

Flavors

Flavor research is currently ongoing. The addition of chocolate and vanillin has been found to be advantageous, and both tobacco extracts and synthetic tobacco flavor mixtures are being investigated.

Assembly

A prototype machine to assemble the front end is being designed by Swanson-Erie. The extremely challenging completion date of February 28, 1988, has been established. Currently our plan is to deliver this prototype to PM for debugging, and when debugging is complete the prototype will be sent to Stackpole's Farmville, Virginia plant where the front end will be assembled.

Needless to say, there are many challenges to meet in order to meet the schedule we have established. In order to do so, we have mounted a large effort. A total of 75 people from both R&D and Engineering are working full and part-time on this program. In addition, we are maintaining a seven-day work week. We have attempted to carry out this program with as little affect as possible on other major programs; however, some important programs have been affected, particularly low tar/high taste, sidestream control, operations support, and tobacco-specific nitrosamines. It should also be pointed out that concurrent with the effort described, we are investigating alternate "smokeless devices" using both combustive and non-combustive heat sources.

FUTURE PLANS

Anticipating a test market of the RJR product in April, 1988 (see the Wall Street Journal, Nov. 13, 1987, p. 19), we intend to be in a position to test market our version of a "smokeless device" no later than July, 1988. The major question is, of course, how will this product do on the market place. We have no doubt that a large percentage of smokers will try the product initially. After the initial trial is over, at least four possible scenarios can be envisioned; 1) the product "bombs" and is withdrawn from the market; 2) sales drop to a very low level (1-2%) where they remain for several years; 3) sales drop to a low level (2-3%) but begin increasing slowly until the product has 5-20% of the market in two to three years; 4) sales stabilize at about 5% of the

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market followed by a gradual increase to 10-15% of the market in two to three years.

Each of the above scenarios demand a different type of response. For instance, in the first case we would have the time to pursue different approaches to providing a product with the perceived benefits of the Delta device. In the second and third cases, however, most of the effort would be in improving the actual device marketed. In addition, programs such as lowered biological activity and tobacco-specific nitrosamines would receive much less effort if the Delta device were to become a major success. Needless to say, we cannot predict which one of these scenarios will actually occur, or even if a fourth scenario will occur; that is, the RJR device will fail completely either because of lack of consumer acceptance or because of government intervention. As a consequence we must be sure that our strategic planning recognizes all possible outcomes, and that we remain flexible enough to respond to all eventualities.

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APPENDIX A

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APPENDIX A

**Summary of Current Major Programs Including Information
on Resource Allocation, Goals, Timetables and Customers**

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R&D MAJOR PROGRAMS (273.1)

A. MENTHOL

1. Total Personnel - 16.7
2. No. of Divisions involved - 7
3. Goals, Timetables, Customers
 - a. Domestic Product Development (3.0) - Successful free-standing menthol brand; 1987; Marketing
 - b. Flavor Development (2.4) - New product, successful consumer test; ongoing; Domestic Product Development, Marketing
 - c. Cigarette Technology (1.5) - Tube-in-Tow filter product, 1987/1988; Concentric filter product; 1988/1989; Pack aroma release concept; 1988/1989; Domestic Product Development
 - d. PED (1.5) - Show direction for potential new menthol, product testing; ongoing; Flavor and Product Development
 - e. Cigarette Testing Services (4.0) - Provide analytical support; ongoing; Domestic product development
 - f. Tobacco Proc. & Fabr. (4.2) - Semiworks Service; ongoing; requestor

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B. LOW DELIVERY/HIGH TASTE

1. Total personnel - 17.7
2. No. of Divisions Involved - 10
3. Goals, Timetables, Customers
 - a. Domestic Product Development (1.5) - Marlboro Ultra Lights, Nov. 1987; Project Extra; ongoing; Marketing, Consumer Research
 - b. Flavor Development (1.3) - New products, successful consumer tests; ongoing; Marketing
 - c. Cigarette Technology (1.5) - Tube-in-Tow Filter Product Transfer; Late 1987; Domestic Product Development
 - d. PED (1.0) - Mapping existing products; ongoing; Flavor Development
 - e. Cigarette Testing (0.5) - Provide analytical support and CI; ongoing; Domestic Product Development
 - f. Chemical Research (4.3) - Acetic acid release agent; 1987; new flavors and new flavor technology; ongoing; Flavor Development
 - g. Physical Research (2.8) - PVA/menthol system; 1987; Cigarette Technology
 - h. Analytical Chemistry (1.7) - Correlate tobacco volatiles with subjective characteristics; ongoing; identify pyrolytic decomposition components and patterns; ongoing; Flavor Development
 - i. Tobacco Proc. & Fabr. (3.0) - Semiworks Service; ongoing; requestor

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C. PROJECT ART

1. Total Personnel - 37.2
2. No. of Divisions Involved - 15
3. Goals, Timetables, Customers
 - a. Domestic Product Development (2.0) - 11 mg product, 1987; Test Market, 1988; Marketing
 - b. Flavor Development (1.5) - External evaluation; ongoing; Marketing
 - c. Cigarette Technology (0.5) - Support; ongoing; Domestic Product Development
 - d. PED (1.5) - Evaluation of product, ongoing; Program Coordinator
 - e. Cigarette Testing (1.0) - Analytical Support; ongoing; Program Coordinator
 - f. Development Engineering (2.0) - Engineering Support; 1987; Manufacturing Engineering
 - g. Chemical Research (0.5) - Development of pilot scale process; 1987; Program Coordinator
 - h. Physical Research (6.0) - Optimize extraction conditions; ongoing; Engineering & New Products Directorate
 - i. Analytical Research (2.6) - Provide analytical support and investigate the mobility of nicotine in its native state; 1988; Program Coordinator
 - j. Administrative Services Division (1.0) - Mechanical and electrical support of stem line installation; 1987; Tobacco Materials Division
 - k. Tobacco Fundamentals Division (1.0) - Engineering support; 1987; Engineering
 - l. Biochemical Research (8.4) - Design procedures for safe disposal of SCFE adsorbers; 1987; Engineering; Isolation of putrescine methyl transferase; 1987; New Products Development
 - m. Tobacco Materials (6.5) - Supply shredded stems and develop means of utilizing spent stems; 1987; Pilot Plant operating team
 - n. Tobacco Proc. & Fabr. (2.7) - Semiworks Service; ongoing; requestor

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D. REDUCED DENSITY ROD

1. Total Personnel - 26.0
2. No. of Divisions involved - 11
3. Goals, Timetables, Customers
 - a. Cigarette Testing Division (1.0) - Analytical support; ongoing; Tobacco Fundamentals Division
 - b. Development Engineering (2.0) - Improving prototype equipment for pneumatic formed rod; ongoing; Tobacco Fundamentals Division
 - c. Physical Research (4.4)
 - (1) Identify desired characteristics of an optimum binder system, ongoing; develop thermal analytical methods for testing for reproducible processing conditions, 1987; Tobacco Materials and Tobacco Fundamentals Division
 - (2) Develop predictive models of mechanical properties of reduced weight rod, ongoing; characterization of MS delivery properties of reduced weight rods, 1987; solve firmness whole smoke problems, ongoing; identify optimum filter systems; Tobacco Fundamentals Division
 - (3) Mechanical engineering support; ongoing; Tobacco Fundamentals Division
 - d. Analytical Research (1.7) - Investigate cross section morphology of foam bound rod, 1987; develop QA procedures for degraded pectin, 1987; microscopic studies, ongoing; evaluate licorice alternatives, 1988; QA and Tobacco Fundamentals Division
 - e. Tobacco Fundamentals Division (13.0)
 - (1) Development of a -150 to 200 mg cigarette, 1987; development of a -300 mg cigarette, 1987; New Products Division; Engineering
 - (2) Development of a foam binder system which is subjectively acceptable, 1987; Product Development; Engineering; Manufacturing
 - f. Tobacco Materials Division (2.0) - Develop a method to produce low molecular weight pectin, 1987; develop alternate foaming agents, 1988; foam-bound rod development team

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g. Tobacco Proc. & Fabr. (1.3) - Semiworks
Service; ongoing; requestor

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E. IGNITION PROPENSITY

1. Total Personnel - 6.7
2. No. of Divisions involved - 6
3. Goals, Timetables, Customers
 - a. Cigarette Technology (1.5) - Long range product development, 1988/1989; Domestic Product Development
 - b. Cigarette Testing (0.5) - Analytical support and CI; ongoing; New Product Development
 - c. Physical Research (3.3) - Develop the know-how to achieve lower ignition propensity, 1987; develop an acceptable product with reduced ignition propensity, 1987; Director of Research
 - d. Tobacco Proc. & Fabr. (0.7) - Semiworks Service; ongoing; requestor

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F. SIDESTREAM CONTROL

1. Total Personnel - 14.7
2. No. of Divisions involved - 7
3. Goals, Timetables, Customers
 - a. Cigarette Technology Division (2.0) - Low sidestream product development, 1987/1988; non-burning smoking article and/or optional smoking device; 1988/1989; Domestic Product Development
 - b. Flavor Development (0.6) - Low sidestream product development; ongoing; Marketing
 - c. Chemical Research (7.5) - Develop an understanding of how currently available papers modify sidestream, 1987; develop additional models for sidestream reduction and select best model, 1988; Cigarette Technology Division
 - d. Analytical Research (0.5) - Investigate elemental morphology of the inner and outer surfaces of relevant cigarette papers, 1987; develop a chemical map of Mg in $Mg(OH)_2$ papers, 1988; Chemical Research Division
 - e. PED (0.8) - Determine limits where consumer perceives a benefit; ongoing; Flavor Development, Product Development, Physical Research
 - f. Physical Research (1.6) - Identify mechanism of action for paper additives such as $Mg(OH)_2$, 1987; design and construct cigarettes with optimum sidestream reduction and acceptable subjectives, ongoing; develop proprietary alternatives to $Mg(OH)_2$, ongoing; Cigarette Technology Division
 - g. Tobacco Proc. & Fabr. (1.7) - Semiworks Service; ongoing; requestor

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G. INTERNATIONAL PRODUCT SUPPORT

1. Total Personnel - 37.7
 2. No. of Divisions involved - 8
 3. Goals, Timetables, Customers
- a. Cigarette Technology Division (0.5) - Scented tear tape; 1987; International Product Development
 - b. Cigarette Testing (16.0) - Analytical support; ongoing; PMI and International Product Development
 - c. Flavor Development (2.0) - New product development; ongoing; International Product Development; Marketing
 - d. Analytical Research (1.5) - Analytical Support; ongoing; Leaf Department
 - e. PED (0.7) - Establish and validate overseas testing panels; ongoing; International Product Development
 - f. International Product Development Division (7.0) - New product development; ongoing; PMI
 - g. Tobacco Proc. & Fabr. (9.7) - Semiworks Service; ongoing; requestor

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H. OPERATIONS SUPPORT

1. Total Personnel - 60.6
2. No. of Divisions involved - 10
3. Goals, Timetables, Customers
- a. Cigarette Technology Division (0.5) - Various; ongoing; unspecified
- b. Physical Research (4.5)
 - (1) Tipping adhesive - rheology and thermal analysis support; ongoing; unspecified
 - (2) Missing pack/carton detection - microwave spectroscopy support; ongoing; unspecified
 - (3) Rod/filter density detection - spectroscopy support; ongoing; unspecified
 - (4) Optical processing and remote sensing - optics, etc. support; ongoing; unspecified
 - (5) Leaf characterization - microwave spectroscopy; ongoing; unspecified
- c. Tobacco Materials Division (6.5) - RL processing, stem processing; ongoing; unspecified
- d. Biochemical Research (6.0) - Develop an alternate tobacco preservative; ongoing; sheet processing plants, primary operations warehouses
- e. Cigarette Testing (4.0) - Analytical support; ongoing; Manufacturing Services
- f. Flavor Development (3.2) - Quality; ongoing; Manufacturing, Marketing, Operations
- g. PED (2.7) - Product evaluation; ongoing; New Product Directorate
- h. Development Engineering (0.5) - Engineering support; ongoing; unspecified
- i. Analytical Research (21.3)
 - (1) Characterization of adhesives - Identify and correlate analytical test data with behavior, 1987; systematic study of behavior as a function of formulation, 1988; Manufacturing

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- (2) Materials evaluation - Characterization of materials in use and proposed for use; ongoing; Manufacturing
 - (3) Customer complaints - Identify compounds responsible for customer complaints; as needed; QA
 - (4) Effect of storage containers on stored tobacco chemistry - Measure selected components at discrete time periods; 1990; Engineering
 - (5) Marlboro Standardization - Analytical support; ongoing; Marlboro Standardization Committee
 - (6) Analytical Flavor Specifications - Set specifications for incoming flavors; 1991; QA, Technical Services, Flavor Center
 - (7) Leaf Analysis - Analytical support; ongoing; Leaf Department
 - (8) Optical Processing - Development of prototype optical processing system; 1988; Manufacturing
 - (9) Microscopy - Identify and measure materials from processes or product; as needed; Manufacturing, QA
- j. Tobacco Proc. & Fabr. (11.4) - Semiworks Service; ongoing; requestor

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I. OPTIMIZATION OF RECONSTITUTED PRODUCTS

1. Total Personnel - 17.2
2. No. of Divisions involved - 7
3. Goals, Timetables, Customers
 - a. Tobacco Materials Division (8.3)
 - (1) RL=RCB - Produce Park 500 test sheets representing best pilot candidates using size reformulation; 1987; PM USA Senior Management
 - (2) RL sheet Stability - Determine effect of RL thermal treatment on cell count reductions and subjective changes; 1987; Manufacturing, Park 500
 - b. Biochemical Research (3.0) - Provide assays for levels and types of microorganisms in process and product; unspecified; Process Development and Sheet Plants
 - c. Cigarette Testing (1.0) - Blend separation, Analytical Support and CI; ongoing; New Product Development, Tobacco Materials Division
 - d. Flavor Development (0.6) - Consumer testing; ongoing; Manufacturing, Marketing
 - e. Analytical Research (2.8) - Analytical support; ongoing; Project 1307
 - f. Tobacco Proc. & Fabr. (1.2) - Semiworks Service; ongoing; requestor

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J. ALTERNATE HUMECTANTS

1. Total Personnel - 8.3
2. No. of Divisions involved - 7
3. Goals, Timetables, Customers
 - a. Tobacco Materials Division (1.1) - Determine the benefits of humectant redistribution on sheet material based on cigarette factory trials; 1987; PM USA Senior Management
 - b. Development Engineering (0.6) - Engineering Support; ongoing; unspecified
 - c. Biochemical Research (4.0) - Remove glycols and glycerine from sheet products; 1988; Sheet Processing Plants
 - d. Cigarette Testing (1.0) - Analytical Support; ongoing; New Product Development; Biomaterials Science
 - e. PED (0.5) - Product evaluation; as needed; unspecified
 - f. Analytical Research (0.6) - Analytical Support; as needed; Program Coordinator
 - g. Tobacco Proc. & Fabr. (0.5) - Semiworks Service; ongoing; requestor

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K. BONDED ENDS

1. Total Personnel - 5.6
2. No. of Divisions involved - 2
3. Goals, Timetables, Customers
 - a. Development Engineering (4.4) - Transfer technology to Manufacturing Engineering; 1987; Manufacturing Engineering
 - b. Tobacco Proc. & Fabr. (1.2) - Semiworks Service; ongoing; requestor

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L. TOBACCO SPECIFIC NITROSAMINES

1. Total Personnel - 7.6
2. No. of Divisions involved - 2
3. Goals, Timetables, Customers
 - a. Biochemical Research (6.6) - Reduce TSNA in MS smoke by at least 50%; 1992; Director of Research
 - b. Chemical Research (1.0) - Complete theoretical study on nitrosation; 1988; greenhouse support, ongoing; Program Coordinator

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M. LOWERED BIOLOGICAL ACTIVITY

1. Total Personnel - 17.1
2. No. of Divisions involved - 3
3. Goals, Timetables, Customers
 - a. Biochemical Research Division (16.0) - Develop a cigarette with CSC with reduced biological activity (>90%) based on in vitro tests; 1990; Flavor Development
 - b. Analytical Research (1.0) - Analytical Support; ongoing; Program Coordinator

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APPENDIX B

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APPENDIX B

Report on PME R&D at Neuchatel

2021553831

PHILIP MORRIS U. S. A.

INTER - OFFICE CORRESPONDENCE

Richmond, Virginia

To: .File Date: August 3, 1987
From: .E. B. Sanders
Subject: .Organization, Programs and Plans for Neuchatel R&D

The Research Center located in Neuchatel, Switzerland, has responsibility for product development and associated research programs for the EEC and EEMA regions. The center consists of 145 people which includes a large QA function.

The laboratory is divided into three functions. The research function, consisting of twenty-six individuals, is handled by a Vice Director who reports to the laboratory Director. Administration support, with ten people, reports to a manager who also reports to the laboratory Director. The largest function, operations services, is composed of 106 people divided into four groups; namely, quality assurance and technical services (69 people), product development (18 people), process development (13 people) and computer application (5 people). The first three groups report to a vice director, while the last group reports to a manager. The complete organizational charts are given at the end of this document.

As might be expected given the size of the research function compared to the size of the overall organization little basic research is carried out at the center. Most of the responsibility of the research personnel is to provide support for product development; that is, to assist the laboratory in making cigarettes better, cheaper and faster. The research function is divided into three groups: microbiology, analytical research and product research. In all three groups the majority of the time is spent in service work and trouble shooting. Research programs which are being pursued are: (1) obtaining natural preservatives for tobacco processing, carried out by the microbiology group; (2) developing on-line analytical measurements for the factory (Infraalyzer), carried out by the analytical group; and (3) studying the effect of cigarette parameters on the amount of certain sidestream smoke components (particularly TSNA) produced in a laboratory setting as well as determining these same components in a variety of normal settings, carried out by the product research group.

The lack of basic research is of considerable concern to some members of the laboratory. It is felt, however, that simply hiring more people would not lead to a significant

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increase in basic research. If this were done it would lead only to more product support work. The recommendation has been made that upper management must mandate increased basic research and that such research would best be done in an external research institute. Reemstma has established such an institute, ERGO, which carries out independent research, contract research for other companies, and research directly for Reemstma. The technology for nitrogen expanded tobacco which Reemstma is now using was developed at ERGO.

Discussion of the Operations Service function will be restricted to the Product Development group, since it is this group which has the responsibility for the development of new products. The European market is facing many of the same problems that the USA market is experiencing, although there is a time lag of several years. The Lausanne economic group predicts that by 1995 industry sales in the EEC region will decline by 7%. The situation, of course, differs from country to country. For instance, while in Germany sales are still increasing slowly, sales are flat in France. Italy, which has the highest antismoking pressure in the EEC region, is exhibiting sales declines. Between May 1986 and May 1987, industry sales in Italy declined 3-7%. The sharp differences among countries requires that different marketing strategies be developed for each country. For instance, Philip Morris is doing extremely well in Germany. The low tar market is growing rapidly in Germany, and Philip Morris with two new low tar products - Marlboro Lights and Philip Morris Extra - is doing extremely well. The five year marketing strategy for Germany is to increase market share of young smokers (under 20) from 40 to 53% and to introduce two new brands - a non filtered Marlboro and a cigarette which will appeal to female smokers.

There is a central product innovation task force for the EEC region which is handled by the marketing group. Although the relationship between this group and the PM Europe R&D product development group is quite good, the product development group is convinced that the best potential new products will emerge via an R&D push as opposed to a marketing pull. There is also a product innovation group with R&D. Its responsibility is not to develop new ideas but rather to implement new ideas. (It should be noted that assisting the product development group is an individual carrying out modeling studies. Computer models have been developed which predict smoking properties based on blend composition.) The two current priority programs in progress at this time are the tube-in-tow filter and the high density cigarette. Use of the tube-in-tow filter has allowed the construction of an ultra low tar cigarette (2 mg) with a flat puff-by-puff profile. This product is in consumer testing at this time. The high density, short cigarette uses less tobacco to deliver the same amount of mainstream tar as compared to a normal cigarette, although puff count is slightly lower. Subjectives are improved. In addition all measured sidestream components (CO,

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NH₃, APM, NO, etc.) except nicotine are reduced by 40 to 50%. These product advantages have not appeared to be sufficient to allow marketing to sell the product. Other concepts which are being explored have a familiar ring to them such as a distinctively flavored cigarette, a premium product, low tar/high taste and a reduced sidestream cigarette.

The product development group is pursuing some extremely interesting ideas pertinent to the problem of developing and testing new products. It is in the process of using a formalized system to select combinations of existing technology for the design of products with significant advantages. Every existing technology (e.g., ventilation, filter design technology) is being listed. Each technology is then rated as to how it affects (positively, negatively, or no effect) certain cigarette properties such as mainstream taste, mainstream impact, MS/SS ratio, CO, puff profile, etc. Secondly, each technology is rated on a five point scale as to its status ranging from completely experimental to universally in use. Lastly these technologies are rated on a 3x3 grid which relates attractiveness (i.e., impact on product) to strength (i.e., how strong is Philip Morris in that particular technology). In this way it is hoped that feasible new product ideas will emerge. This study will be completed for presentation at the Greenbrier meeting in late August.

With regard to product testing there is concern that insufficient product oriented market research is carried out, and that product testing is not done properly in Europe. PM Europe R&D is now using a monadic attribute evaluation system. A smoker is asked to rate product attributes on a straight line constructed in such a way that a mid-line response would be ideal. This technique was used to develop a Virginia type cigarette for the UK which was to have been designed to compete with an existing product. Smokers of the existing product were asked to rate their own cigarette using this technique. Repeat tests were found to be surprisingly reproducible. Those attributes which were found to deviate significantly from a mid-line response were then taken as the objectives for the new product. When a cigarette had been designed which gave considerably improved ratings by smokers of the existing brand, it was submitted for blind product testing against the commercial brand. The test cigarette was preferred 75/25. Unfortunately this cigarette has not yet been introduced into the UK because of financial problems unique to the UK market.

With regard to new products the Vice Director of Product Development stressed that there are two distinct types of product advantages which he labels offensive and defensive. Strategies related to these two types of advantages should be quite distinct. Marketing should be concerned only with short term aggressive innovations, and should use these concepts as the basis for new products. R&D and Operations should be concerned with defensive strategies. Defensive alterations

which can be incorporated at a low level without leading to a subjective difference should be done to all our products simultaneously. The following year additional changes can be effected. For instance, rather than have as a strategic goal a free-standing brand with 75% reduction in sidestream visibility, all Philip Morris brands should be modified to achieve perhaps a 10% reduction in sidestream visibility; that is, the largest reduction which can be achieved without a perceptual subjective difference. The following year, the 10% reduction can be increased to a 20% reduction. Eventually, all PM brands may achieve a 75% reduction without, (1) the consumer being aware of the changes, and (2) with the consumer of the opinion that no subjective alteration had occurred. This strategy was used effectively to bring all PM products up to their present utilization of sheet materials.

Considerable attention is devoted to European competitors. Competitors in the EEC region are patenting much more aggressively than is Neuchatel R&D. In addition we are not fighting some of these patents effectively enough. This aggressive posture by our competitors is a result of the fact that at this time most of them in the EEC have been suffering with respect to sales because of Philip Morris. There are indications that BAT will market Capri in Europe, and that Reynolds will market a low sidestream product. It should also be noted that despite PM's considerable success one of the fastest growing cigarette in Europe is Camel.

The largest department at Neuchatel R&D is Quality Assurance and Technical Services. This department is divided into four divisions; Incoming Control (21), Product Quality Audit (36), QC FTR (1) and Manufacturing Services (6). The overall objective of the Quality Assurance department is to ensure that the highest quality is achieved in all aspects of the business. Maintaining high quality is an important strategic goal. The Incoming Control Division is divided into four groups; namely, analytical services with six people, new tobacco materials with seven people, the tobacco monitoring group with seven people, and entomology which has one person. Programs for the Incoming Materials Division are: (1) review and better define incoming inspection procedures for materials in Europe to allow R&D to reduce their efforts so that most of the responsibilities can be transferred to the suppliers; (2) develop an increased understanding of adhesives; (3) review all analytical procedures and all quality problems to determine if there are unnecessary analyses currently being conducted, or analyses not being done which should be done; (4) tobacco lot analysis and tobacco quality analysis, and (5) relate physical characteristics with production yields.

Programs for the Quality Audit Division are: (1) to review data worldwide to ensure that standard quality ratings are being used; (2) to ensure that the quality audit correctly reflects customer concerns; (3) to review panel procedures and ensure that information gained is being used properly; and (4)

robotics. Manufacturing Services sets specifications for products.

A summary of my visit is given below:

1. R&D Neuchatel will not undertake basic research. It plans, however, to utilize the Cologne laboratory for such research, and anticipates that Philip Morris USA R&D will assist.
2. There is a strong desire to strengthen ties between R&D and marketing. One possible way to do this is to transfer an R&D person to PMI marketing in New York for six months.
3. All groups will spend considerable time with their customers. As time progresses many product ideas will emerge via an R&D push as opposed to a marketing pull.
4. There is considerable need to strengthen ties with PM USA R&D. Several possible ways of doing this are by exchange of personnel, mutual visits and joint meetings.
5. All new programs will be discussed with PM USA R&D before implementation. Richmond R&D would be expected to give input and advice. If possible Richmond should provide active consulting and hands-on assistance.
6. Neuchatel R&D will adopt a planning structure similar to that being developed at PM USA R&D.
7. New product development for EEC and EEMA has been more successful than for USA because direct government intervention abroad is more common.

Based on this visit several recommendations concerning the R&D Strategic Plan can be made.

1. A close relationship between R&D and marketing worldwide including USA must be developed.
2. PM USA R&D needs to strengthen its product and process development for international regions outside of EEC and EEMA.
3. Improved consumer testing must be made a high priority for PM USA R&D.
4. Close cooperation between R&D in Richmond and Neuchatel must be maintained.

5. In that PM USA is the only R&D organization worldwide which can carry out basic research, a significant basic research effort must be maintained.
6. All groups within PM USA should cultivate a close relationship with their customers.

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EEC Region R&D

(144 people)

Dr. Manuel C. Bourlas
Director
Research & Development
for the
EEC & EEMA Regions

Elisabeth Lambert, Secretary

Dr. Walter Fink
Vice Director
Research
(25 people)

Raymond Hirsbrunner
Manager
Administrative Support
(9 people)

Francisco Lopes

Urs Nyffeler

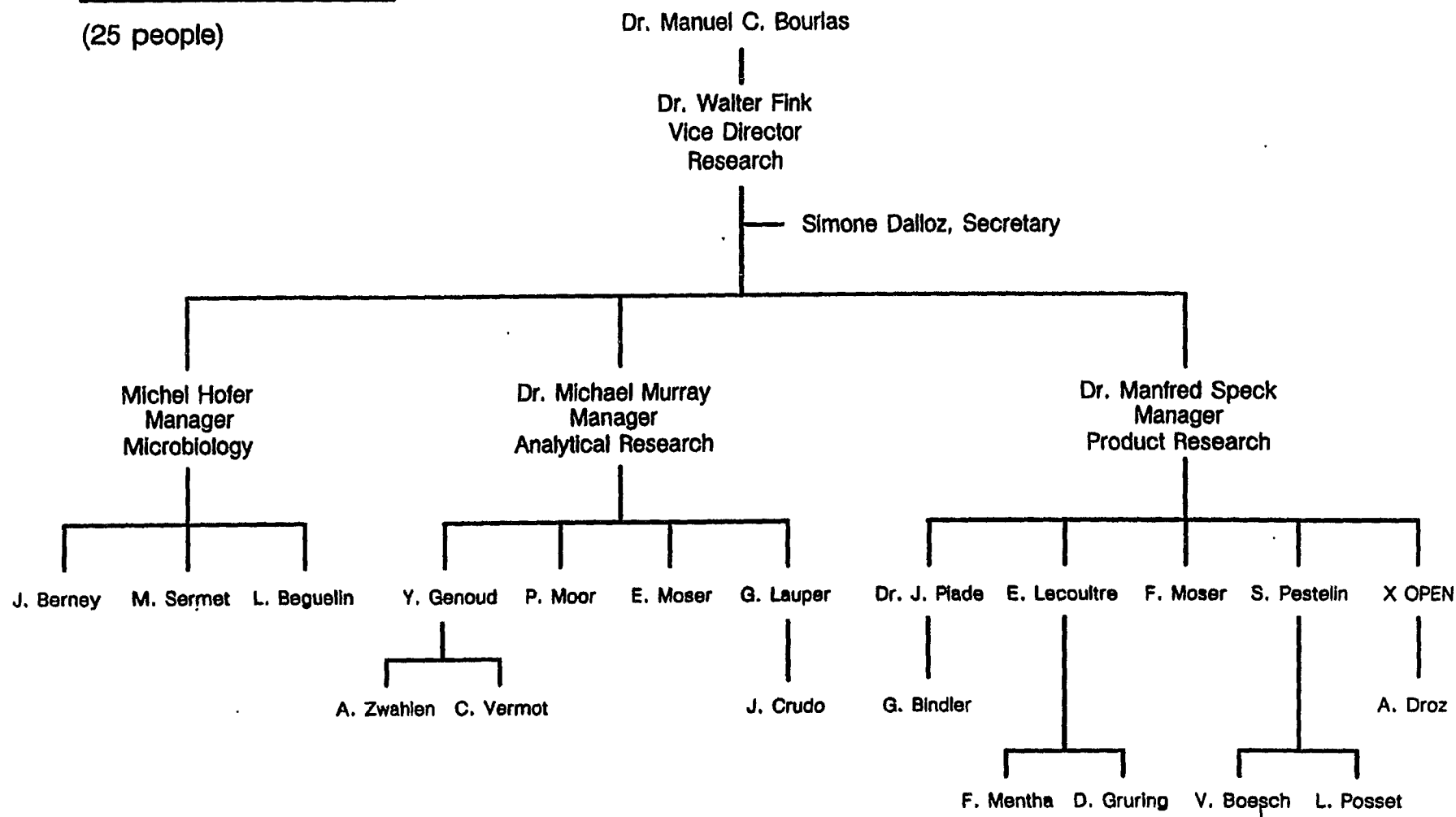
Herman Friedrich

David Clark

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EEC Region R&D

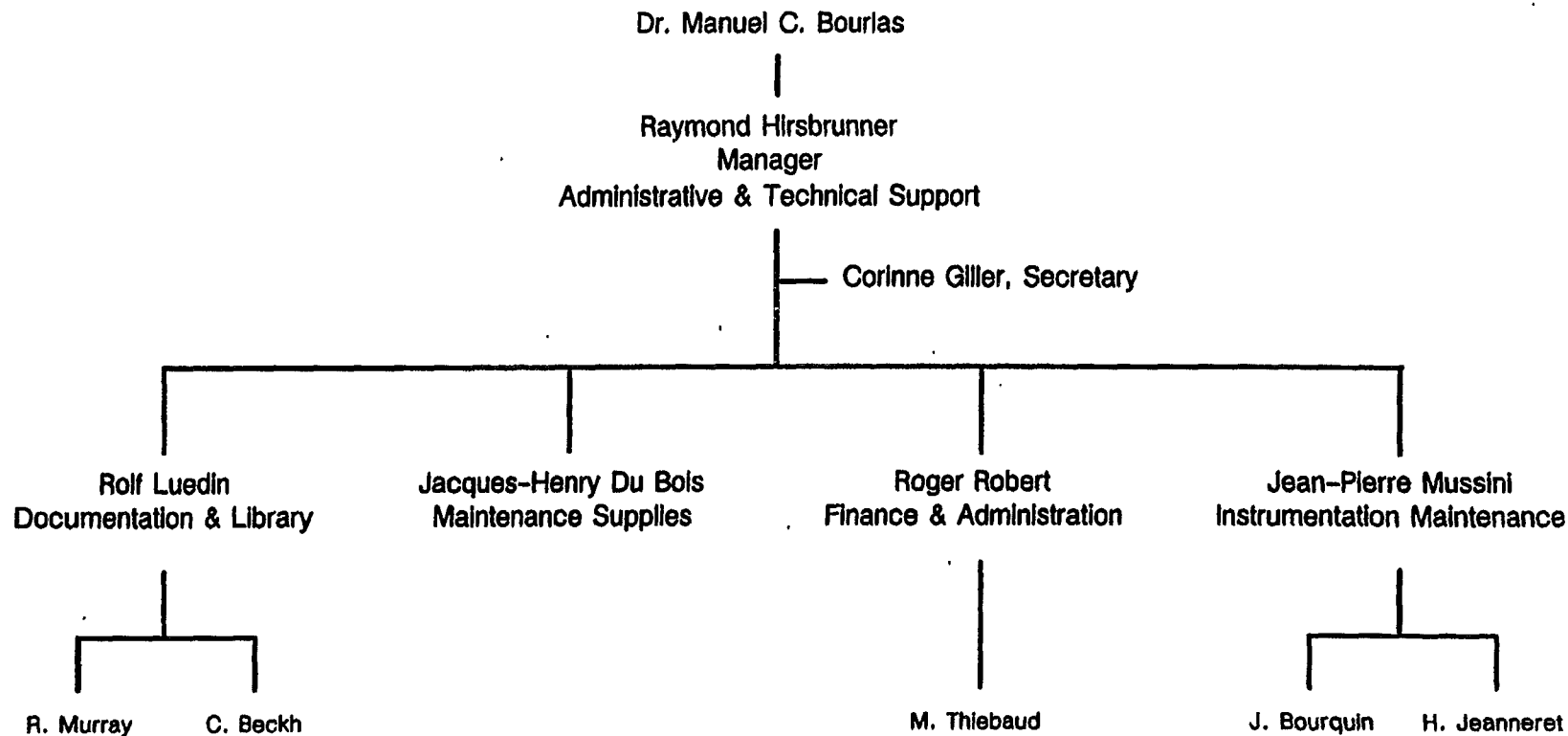
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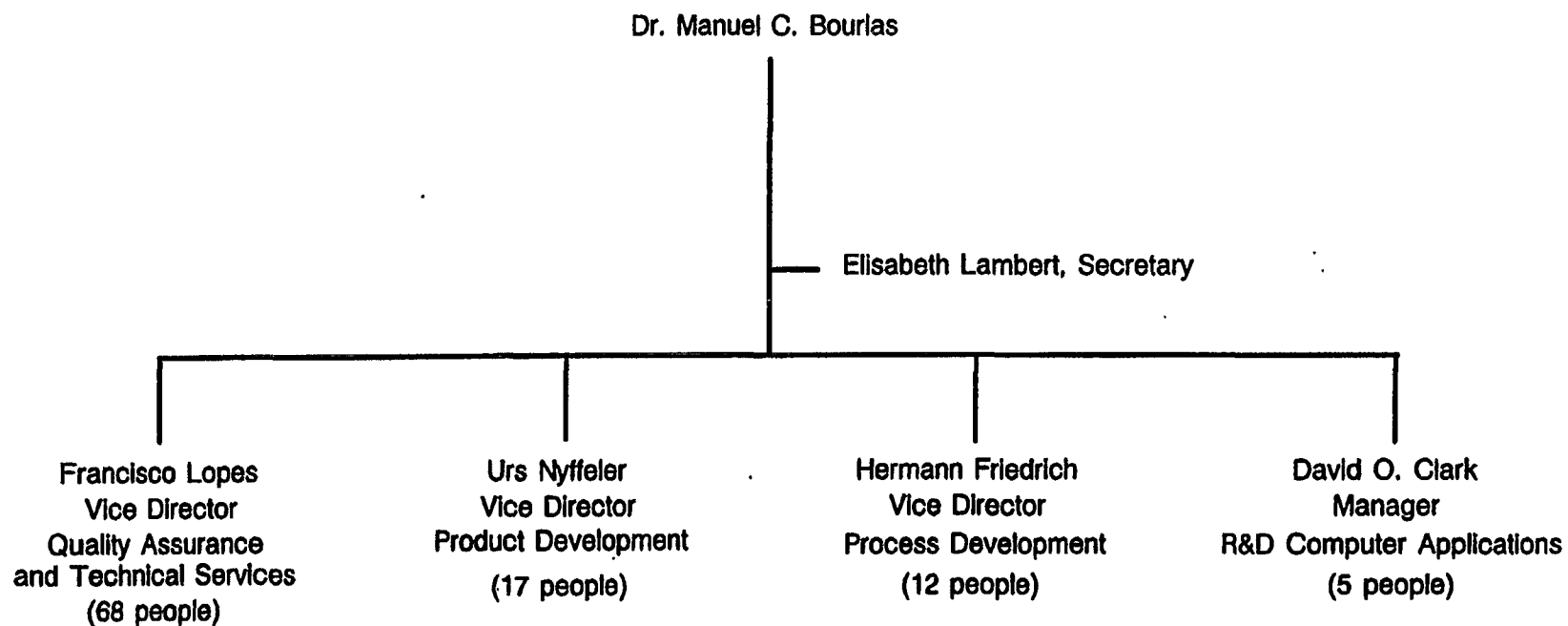
EEC Region R&D

(9 people)



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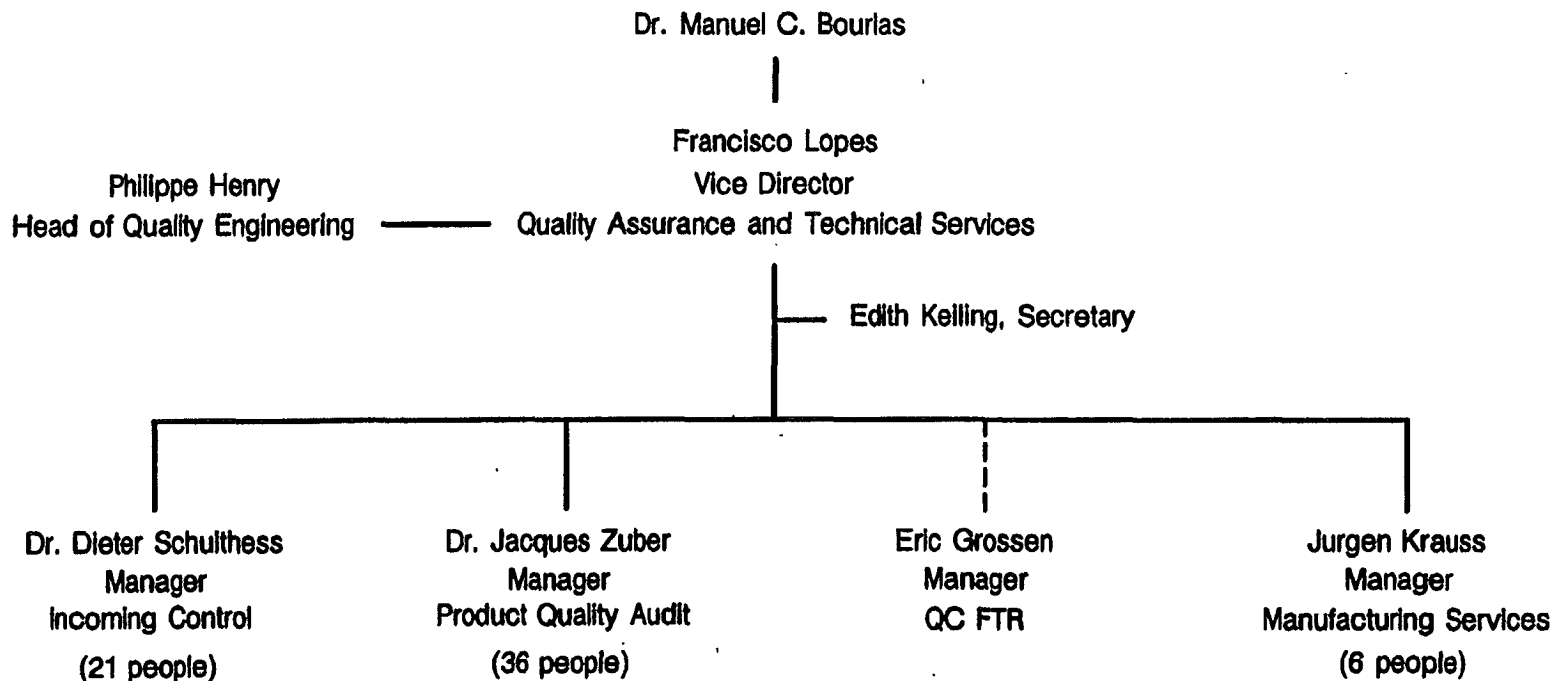
EEC Region R&D



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EEC Region R&D

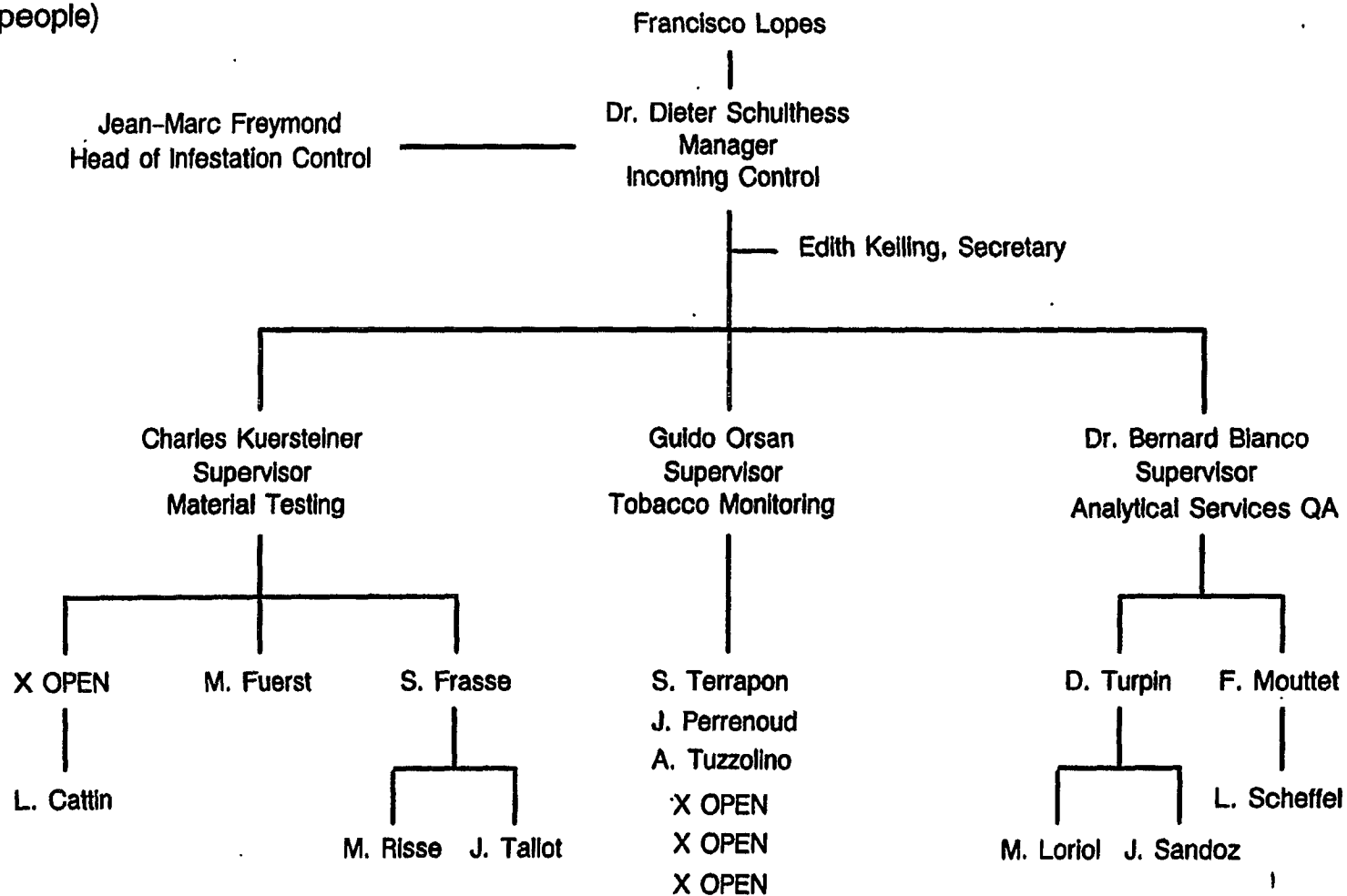
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EEC Region R&D

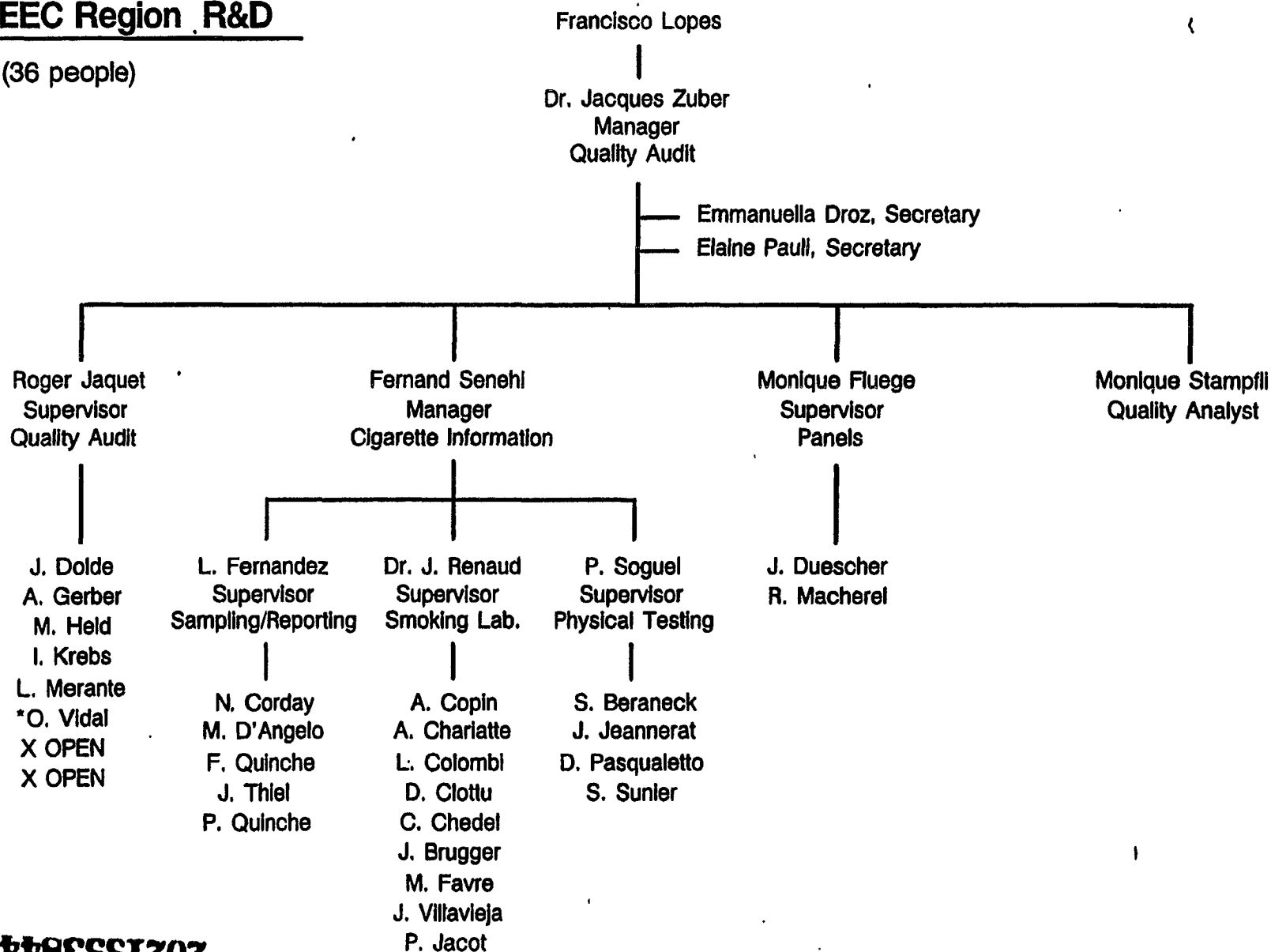
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EEC Region R&D

(36 people)

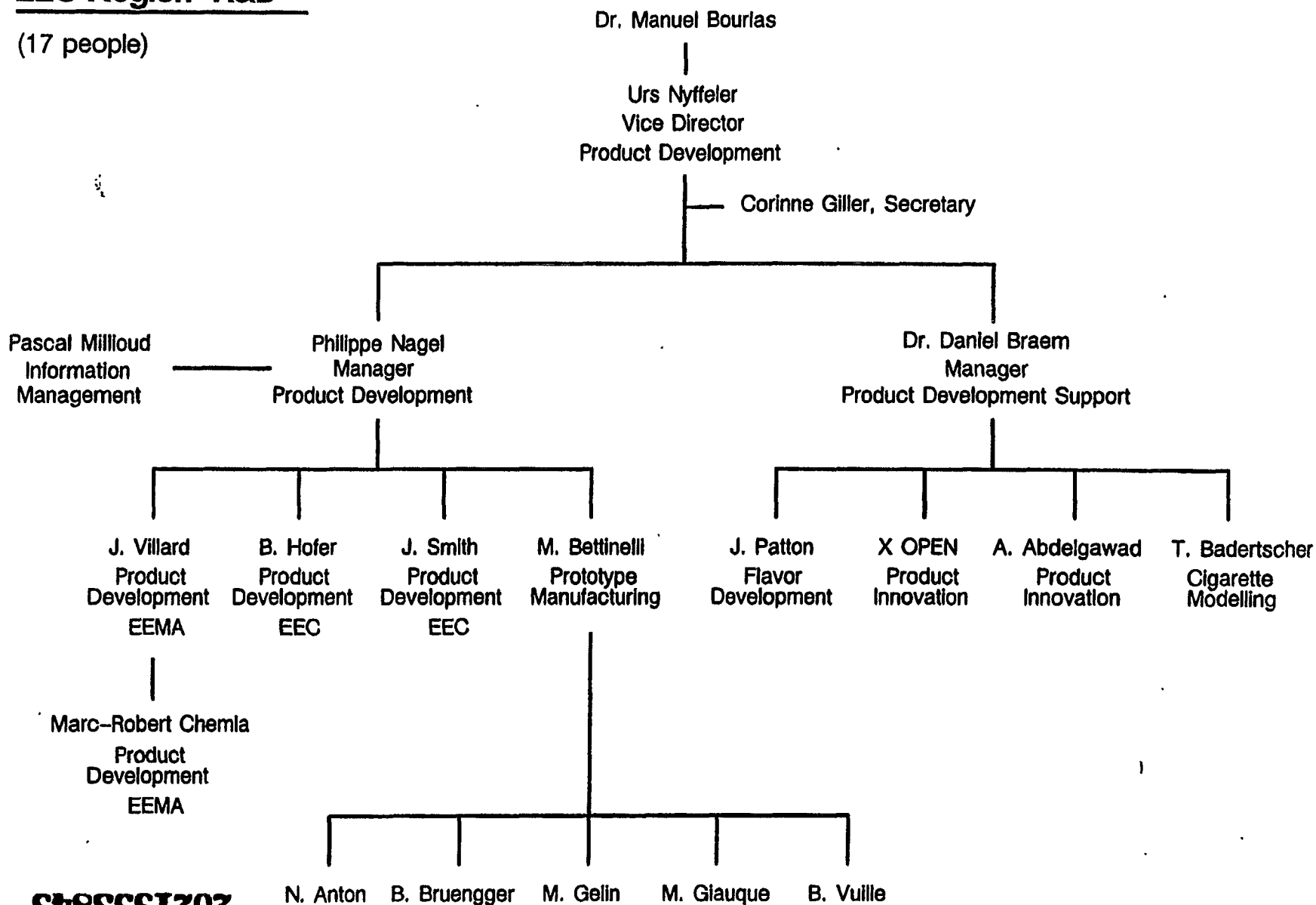


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*Replaces L. Merante who will retire at the end of 1986.

EEC Region R&D

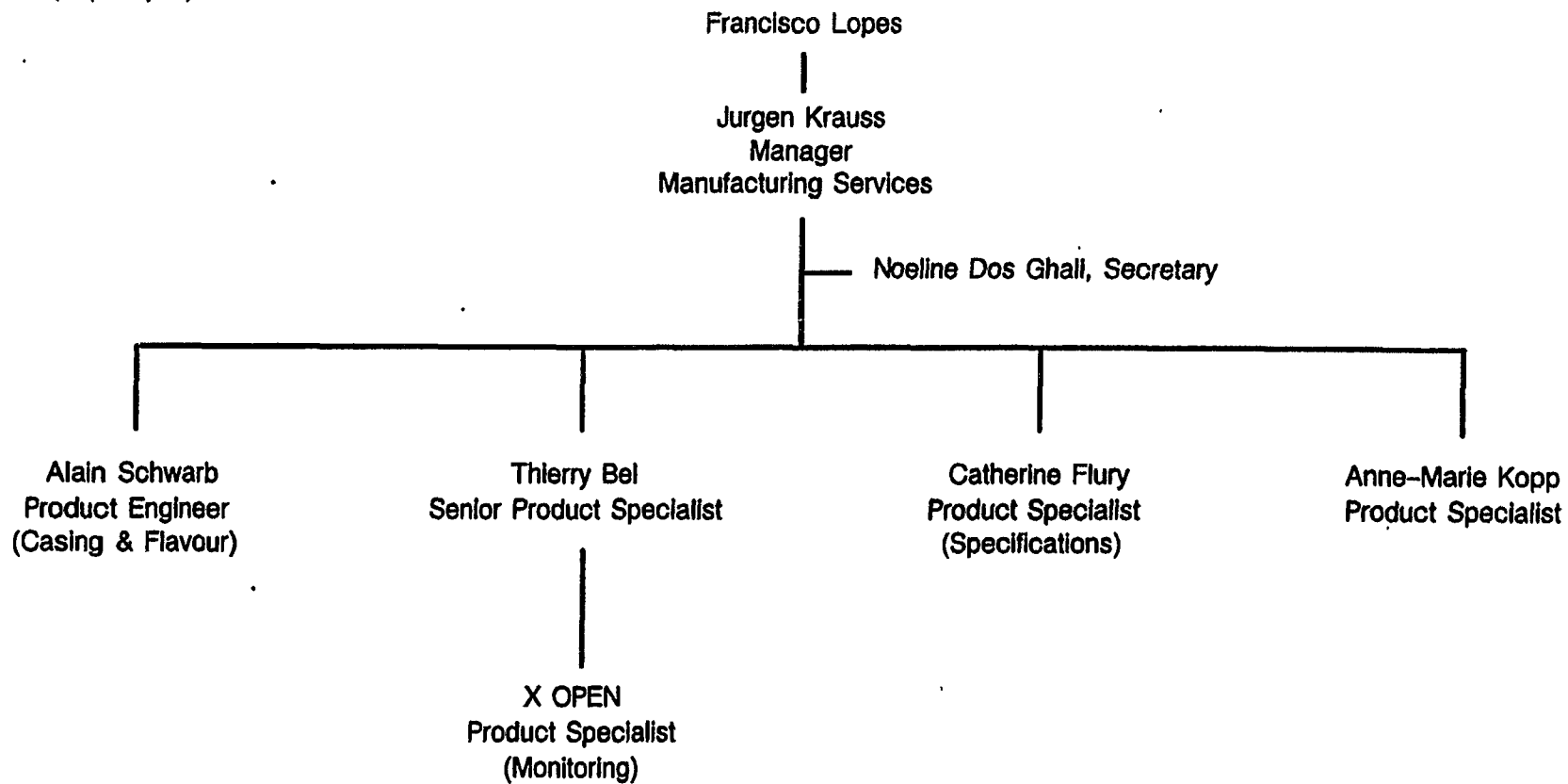
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EEC Region R&D

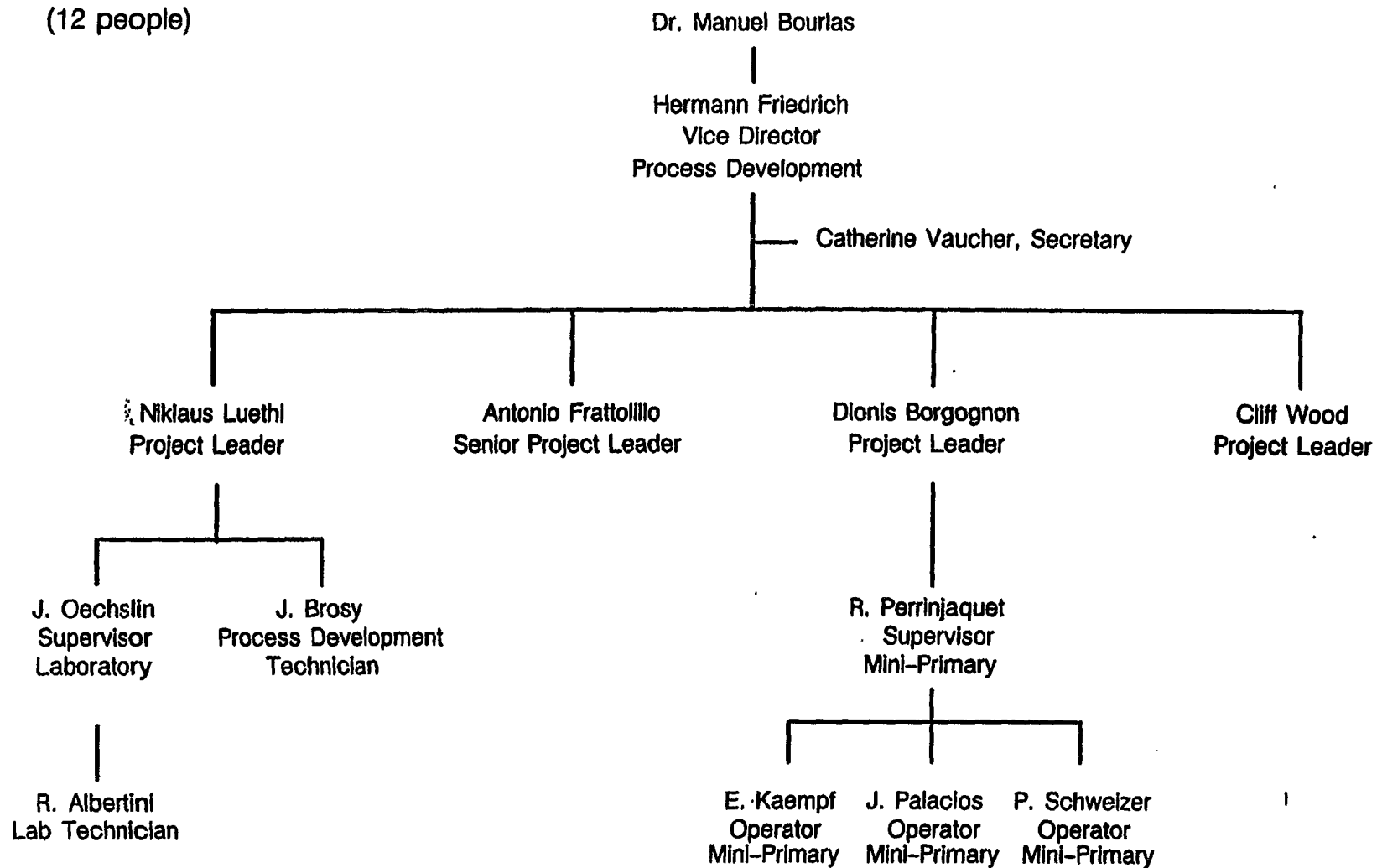
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EEC Region R&D

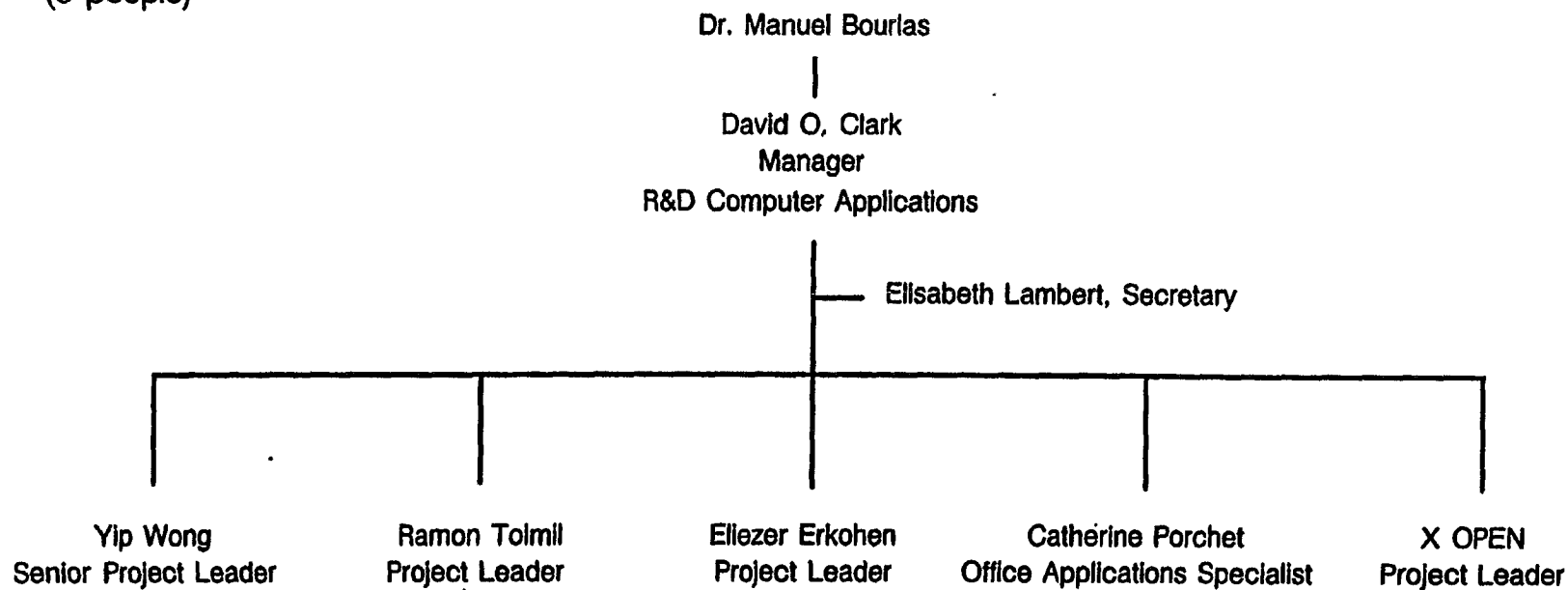
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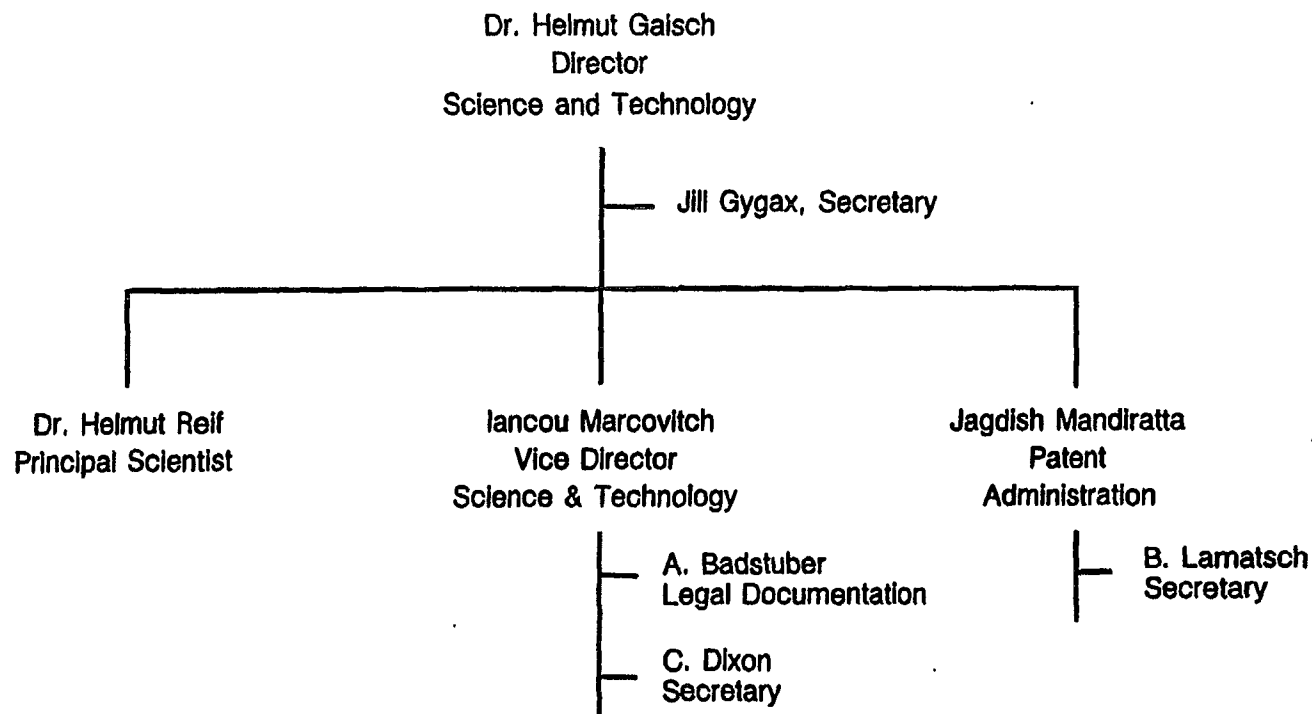
(5 people)



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EEC Region S&T

(7 people)



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APPENDIX C
Competitive Profiles

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COMPETITOR PROFILES

The profiles of the various competitors were developed from information found in the public press (trade journals, newsletters, and newspapers, etc.). An attempt was made to keep the information relatively current by using sources generally in the 1982 - 1987 period. It should be understood that the profiles are like a patchwork quilts, in that they are put together from "bits-and-pieces" and some guess work.

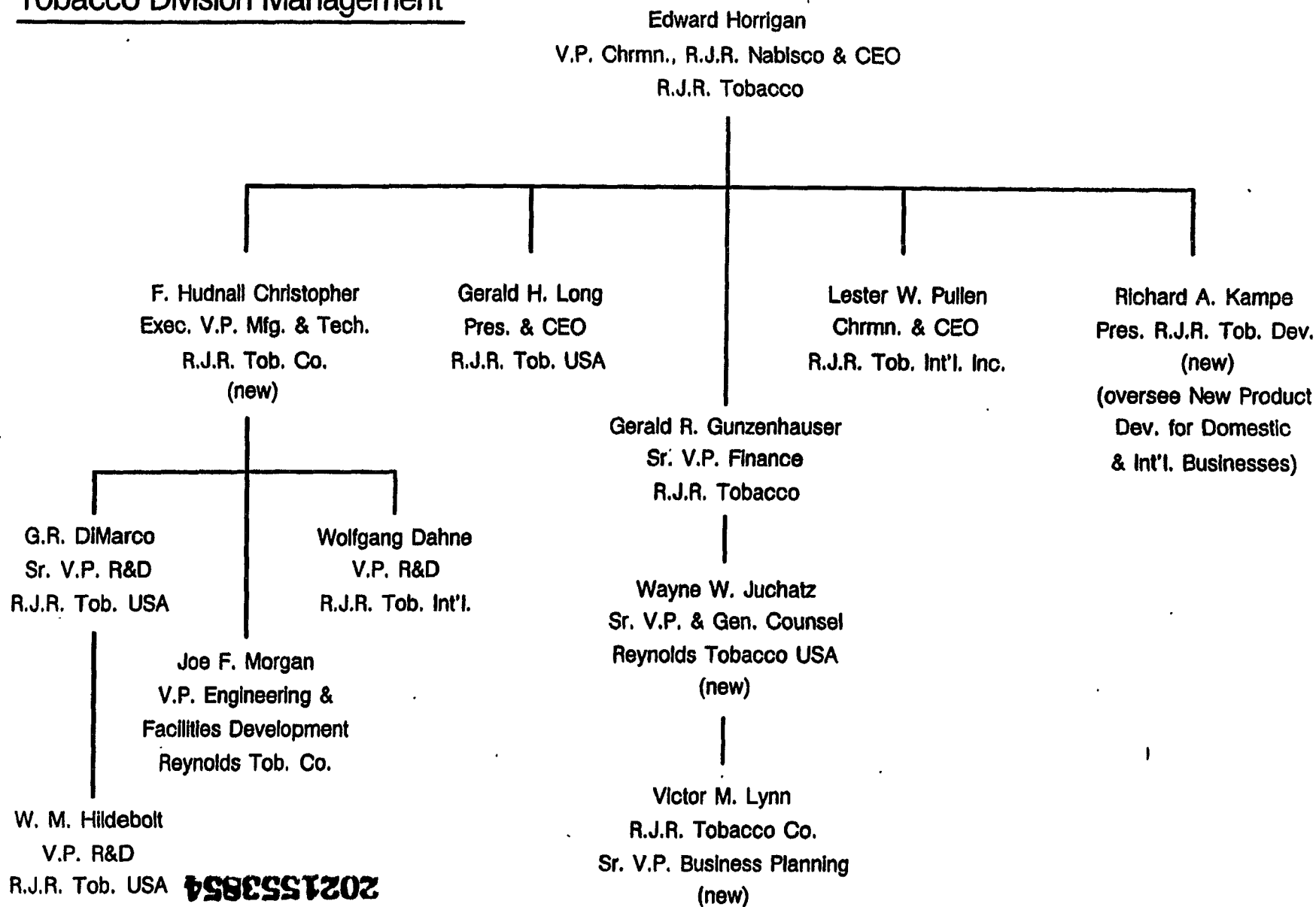
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R. J. REYNOLDS TOBACCO - U.S.A.

The detailed information that has been gathered on R. J. Reynolds is discussed in the body of this report (See Section F). Only the biographies of key R&D personnel are included here.

2021553853

RJR – Nabisco Tobacco Division Management



Subject: .FLOYD HUDNALL CHRISTOPHER, JR.: A BIOGRAPHY

The following is a complete biography on Floyd H. Christopher, Jr.:

PERSONAL: **REDACTED**

EDUCATION: BSChE, University of Virginia, 1955
MS, Massachusetts Institute of Technology, 1959

MAJOR: Chemical Engineering

WORK HISTORY: United States Navy/Lt. Jg., 1955-57
R. J. Reynolds Industries/RJR Archer, Inc./
from plant manager to chief
executive officer, 1959-81
R. J. Reynolds Tobacco Company/senior
vice-president, 1981-83
R. J. Reynolds Tobacco Company/executive
vice-president/manufacturing &
technology, 1983-present
R. J. Reynolds Industries/RJR Archer, Inc./
director, 1979-present
R. J. Reynolds Tobacco Company/director,
1981-present

CONCURRENT
POSITIONS: United Way Forsyth County/board of directors,
1978-present
Children's Center for the Physically
Handicapped/board of directors
Wake Forest University/board of visitors
Sweet Briar College/board of overseers

MEMBERSHIP: Aluminum Association (director 1979-81)

PRESENT ADDRESS: **REDACTED**

Office: R. J. Reynolds Tobacco Company
401 N. Main Street
P. O. Box 2959
Winston-Salem, NC 27102

2021553855

Subject: .G. ROBERT DIMARCO: A BIOGRAPHY

The following is a complete biography on Dr. G. Robert DiMarco from the AMERICAN MEN & WOMEN OF SCIENCE (1986):

PERSONAL:

REDACTED

EDUCATION:

BS, Rutgers University, 1954
PhD, Rutgers University, 1959

MAJOR:

Plant pathology

WORK HISTORY:

Rutgers University/from assistant professor to professor/food science, 1959-74
General Foods Corporation/director/basic & health science, 1975-77
General Foods Corporation/director/central research, 1977-82
R. J. Reynolds Tobacco Company/from vice-president to senior vice-president/research & development, 1982-present

CONCURRENT POSITIONS:

Rutgers University, Cook College/
Honorary professor/food science, 1975-present
National Research Council, Military Personnel Supplies/committee member/advisory board, 1978-81
Food Industry Liaison Advisory Panel/AMA, 1978-present

MEMBERSHIPS:

REDACTED

RESEARCH:

Research administration in nutrition; physiology, biochemistry; physical chemistry; engineering; research from very basic to totally applied

PRESENT ADDRESS:

R. J. Reynolds Tobacco Company
Technical Center B16
Winston-Salem, NC 27102

2021553856

Subject: .WILLIAM M. HILDEBOLT: A BIOGRAPHY

The following is a complete biography on Dr. William M. Hildebolt from WHO'S WHO IN TECHNOLOGY (1986):

PERSONAL: **REDACTED**

EDUCATION: BS, Ohio State University, 1966
MS, Ohio State University, 1967
PhD, Ohio State University, 1969

WORK HISTORY: Ohio State University/professor/
food technology
Campbell Soup Company/vice-president/
product technology, prior
to 1985
R. J. Reynolds Tobacco Company/vice-
president/research &
development, 1985-present

MEMBERSHIPS: **REDACTED**

RESEARCH: Food science; new products process
development

PRESENT ADDRESS: R. J. Reynolds Tobacco Company
Bowman Gray Technical Center
Reynolds Blvd.
Winston-Salem, NC 27105

Subject: .VICTOR M. LYNN: A BIOGRAPHY

Victor M. Lynn is not listed in any of the standard biographical directories.

According to news releases in March 1987, Victor M. Lynn, 60, joined R. J. Reynolds Tobacco Company as senior vice-president of business planning, a new post. He was previously senior vice-president management representative heading up RJR Nabisco's Heublein business at McCann-Erickson, New York.

Lynn's present address is: R. J. Reynolds Tobacco Company, 401 North Main Street, Winston-Salem, NC 27102.

2021553857

Subject: .WOLFGANG D. DAEHNE: A BIOGRAPHY

Wolfgang D. Daehne is not listed in any of the standard biographical directories.

According to the various tobacco literature, he was named vice-president of research and development at R. J. Reynolds Tobacco Company International, Inc. in 1982 and continues to hold this position.

Daehne joined Reynolds in 1976 as director of leaf/research at R. J. Reynolds Tobacco GmbH in Cologne, West Germany. He was promoted in January 1979 to director of leaf in Europe/Africa/Middle East headquarters in Geneva, Switzerland. He later became vice-president of operations of this headquarters.

His present address is: R. J. Reynolds Tobacco International, Inc., 401 North Main Street, P. O. Box 2959, Winston-Salem, NC 27102.

2021553858

Subject: .RICHARD A. KAMPE: A BIOGRAPHY

Richard A. Kampe is not listed in any of the standard biographical directories.

According to news releases in March 1987, RJR Nabisco created a third operating unit at R. J. Reynolds Tobacco Company called R. J. Reynolds Tobacco Development Company. This unit is intended to foster better coordination in new product research and development.

Richard A. Kampe, 41, was promoted to head this new unit as president. He was previously executive vice-president of marketing for R. J. Reynolds Tobacco USA.

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BROWN & WILLIAMSON TOBACCO CORPORATION

SEE THE ATTACHED ADVERTISING AGE PROFILE

Within the past few years B&W has closed its cigarette manufacturing facilities in Louisville, Ky. and Petersburg, Va. and consolidated production at its Macon, Ga. plant. Their R&D budget in 1985 was estimated to be between \$20-\$25 million. In 1984 B&W announced that they would "centralize and expand" their R&D facilities in a vacant Louisville building that formerly housed its world headquarters. A company official said the expanded facilities would be devoted to "scientific research in the tobacco field," especially relating to the development of new brands. The building to be renovated has 300,000 sq. ft. and will be called the Hill Street Technical Research Center. It will house about 400 employees.

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Table 4. Estimated Results of B.A.T. Industries (pounds in millions)*

| | 1985 | | 1986(E) | | 1987(E) | |
|----------------------------|--------|----------------|---------|----------------|---------|----------------|
| | Amt | Yr-to-Yr % Chg | Amt | Yr-to-Yr % Chg | Amt | Yr-to-Yr % Chg |
| Revenues | | | | | | |
| Tobacco | 6,154 | -11 | 7400 | 20 | 8200 | 11 |
| Retailing | 3,914 | -13 | 3,425 | -12 | 3,400 | -1 |
| Paper | 1,448 | 5 | 1625 | 12 | 1650 | 2 |
| Other | 1,180 | -26 | 730 | -38 | 1475 | 102 |
| Revenues | 12,696 | -12 | 13180 | 4 | 14725 | 12 |
| Operating income | | | | | | |
| Tobacco | 647 | -7 | 690 | 7 | 805 | 17 |
| Retailing | 136 | -38 | 165 | 21 | 195 | 18 |
| Paper | 156 | 8 | 210 | 35 | 240 | 14 |
| Other | 49 | -47 | 42 | -14 | 50 | 19 |
| Financial services | 137 | 10 | 225 | 64 | 270 | 20 |
| Total operating income | 1,125 | -12 | 1332 | 18 | 1560 | 17 |
| Nonoperating income | | | | | | |
| Net interest expense | -120 | 100 | -120 | 0 | -98 | -18 |
| Associated companies | 163 | -15 | 140 | -14 | 160 | 14 |
| Total | 43 | -67 | 20 | -53 | 62 | 210 |
| Pretax earnings | 1,168 | -17 | 1352 | 16 | 1622 | 20 |
| Taxes | 431 | -19 | 500 | 16 | 594 | 19 |
| Inc incl minority interest | 737 | -16 | 852 | 16 | 1028 | 21 |
| Minority interest | 63 | -29 | 60 | -5 | 60 | 0 |
| Net income | 674 | -14 | 792 | 18 | 968 | 22 |
| Earnings per share | 45.8 | -14 | 53.5 | 17 | 65.0 | 21 |
| Average shares(millions) | 1,472 | 1 | 1,480 | 1 | 1,490 | 1 |
| Operating margins(%) | | | | | | |
| Tobacco | 10.5 | | 9.3 | | 9.8 | |
| Retailing | 3.5 | | 4.8 | | 5.7 | |
| Paper | 10.8 | | 12.9 | | 14.5 | |
| Other | 4.2 | | 5.8 | | 3.4 | |
| Total operating margin | 8.9 | | 10.1 | | 10.6 | |
| Pretax margin | 9.2 | | 10.3 | | 11.0 | |
| Tax rate | 36.9 | | 37.0 | | 36.6 | |
| Net margin | 5.3 | | 6.0 | | 6.6 | |

— Interim Results —

| | 1985 | 1st Half | 2nd Half |
|-----------------------------|---------|----------|----------|
| Revenues | 10650.0 | | 16062.0 |
| Pre-Tax Income | 438.0 | | 730.0 |
| Taxes | 174.0 | | 257.0 |
| Tax Rate | 39.7 | | 35.2 |
| Net Income | 241.0 | | 433.0 |
| Earnings per share | 16.37 | | 29.42 |
| 1986 | | | |
| Revenues | 14830.0 | | |
| Pre-Tax Income | 539.0 | | |
| Taxes | 195.0 | | |
| Tax Rate | 36.2 | | |
| Net Income | 323.0 | | |
| Earnings per share | 21.84 | | 28.16(E) |
| Year to year percent change | 33 | | -4 |

Source: Company's annual and quarterly reports.

Note: All data are currency items unless otherwise indicated.

(E) Kidder, Peabody & Co. Incorporated estimates.

(a) Except per-share data.

2021553861

Subject: .EARL EUGENE KOHNHORST: A BIOGRAPHY-

The following is a complete biography on Earl Eugene Kohnhorst from the AMERICAN MEN & WOMEN OF SCIENCE (1986):

PERSONAL:

REDACTED

EDUCATION:

BChE, University of Louisville, 1970
MChE, University of Louisville, 1971

WORK HISTORY:

Brown & Williamson Tobacco Corporation/
process engineer, 1971-76
Brown & Williamson Tobacco Corporation/
manager/development center,
1976-79
Brown & Williamson Tobacco Corporation/
director/manufacturing planning,
1979-80
Brown & Williamson Tobacco Corporation/
director/manufacturing planning
and engineering, 1980-83
Brown & Williamson Tobacco Corporation/
vice-president/research development
& engineering, 1983-present

MEMBERSHIP:

REDACTED

RESEARCH:

Catalytic conversion of nitric oxides using
rare earth catalysts; determining mechanisms
and kinetic rate equations

EMPLOYMENT CLASS:

Industry

PRESENT ADDRESS:

Office: Brown & Williamson Tobacco
Corporation
P. O. Box 35090
Louisville, KY 40232

REDACTED

2021553862

Subject: .ROBERT ALOIS SANFORD: A BIOGRAPHY

The following is a complete biography on Dr. Robert Alois Sanford from the AMERICAN MEN & WOMEN OF SCIENCE (1986):

REDACTED

PERSONAL:

REDACTED

EDUCATION:

BS, St. Louis University, 1943
PhD, Purdue University, 1949

MAJOR:

Chemical Engineering and Chemistry

WORK HISTORY:

University of Pittsburgh/assistant/
organic chemistry, 1943-44
University of Rochester, Manhattan
Project/research chemist,
1944-46
Sinclair Research Labs, Inc., Catalysis
Research Division/research
chemist, 1949-52
Sinclair Research Labs, Inc., Petroleum
Division/research chemist,
1952-53
Sinclair Research Labs, Inc., Petroleum
Division/group leader, 1953-57
Sinclair Research Labs, Inc., Research
Division/assistant director,
1957-60
Sinclair Research Labs, Inc., Explorer
Division/director, 1960-66
Brown & Williamson Tobacco Company/
director, 1966-79
Brown & Williamson Tobacco Company/
vice-president/research &
development, 1979-83
Brown & Williamson Tobacco Company/
vice-president/science &
technology, 1983-present

RESEARCH:

Chemical engineering; heterogeneous catalysis;
petrochemicals; organic chemistry

EMPLOYMENT CLASS:

Consulting

PRESENT ADDRESS:

REDACTED

2021553863

LORILLARD CORPORATION

SEE THE ATTACHED ADVERTISING AGE PROFILE

Lorillard is part of Loews Corp. In 1984 Lorillard closed its Louisville plant and consolidated its cigarette manufacturing in Greensboro, N.C. Lorillard's 1985 R&D budget was estimated at \$12-\$15 million. Newport is their leading brand, having replaced Kent in 1985. Lorillard does not have any generic or price/value entries in the market.

2021553865

Subject: .ALEXANDER WHITE SPEARS, III: A BIOGRAPHY

The following is a complete biography on Dr. Alexander White Spears, III from AMERICAN MEN & WOMEN OF SCIENCE (1986):

PERSONAL:

REDACTED

EDUCATION:

BS, Allegheny College, 1953
PhD, University Buffalo, 1960

MAJOR:

Chemistry

WORK HISTORY:

University of Buffalo/research associate
chemist, 1956-58
Millard Fillmore College/instructor,
1958-59
P. Lorillard Company, Research Division/
research associate, 1959-61
P. Lorillard Company, Research Division/
senior research chemist, 1961-65
P. Lorillard Company/director/basic
research, 1965-68
P. Lorillard Company/vice-president/
research & development, 1971-75
P. Lorillard Company/senior vice-president/
research & development, 1975-77
Lorillard Corporation/executive vice-
president/operations & research,
1977-present

MEMBERSHIPS:

REDACTED

HONORS & AWARDS:

Distinguished Achievement Award in Tobacco
Science/Philip Morris Inc., 1970

RESEARCH:

Cancer chemotherapy; pyrolytic reactions
and products; spectroscopy; chromatography

EMPLOYMENT CLASS: Industry

PRESENT ADDRESS:

Lorillard Corporation
420 English Street
Greensboro, NC 27405

2021553866

Subject: .FREDERICK JOHN SCHULTZ: A BIOGRAPHY

The following is a complete biography on Dr. Frederick John Schultz from the AMERICAN MEN & WOMEN OF SCIENCE - (1986):

REDACTED

PERSONAL:

EDUCATION:

BA, Augustana College Illinois, 1952
MA, DePauw University, 1956
PhD, University of Iowa, 1960

MAJOR:

Chemistry

WORK HISTORY:

Lorillard, Inc./research chemist,
1959-62
Lorillard, Inc./senior research chemist,
1962-65
Lorillard, Inc./product development
manager, 1965-68
Lorillard, Inc., Research Division/
manager/research, 1968-75
Lorillard, Inc., Research Division/
director, 1975-78
Lorillard, Inc./vice-president/research
& development, 1978-present

MEMBERSHIPS:

REDACTED

RESEARCH:

Composition of tobacco and tobacco smoke;
relation of composition to biological
activity and organoleptic properties;
selective filtration of tobacco smoke;
analytical methods development; new
products in areas of tobacco and food
products

EMPLOYMENT CLASS:

Industry

PRESENT ADDRESS:

Lorillard Research Center
P. O. Box 21688
Greensboro, NC 27420

2021553867

VELLO NORMAN; BIOGRAPHICAL NOTES*

BORN: REDACTED

EDUCATION: Ph.D., University of North Carolina,
Chapel Hill
Undergraduate degrees, Ohio State
University

MAJOR: Physical chemistry

WORK HISTORY: Ethyl Corporation, Baton Rouge, La.

Liggett & Myers, Durham, N.C./
app. 1963 - 1979 (positions not known)

Lorillard Corp., Greensboro, N.C./
Director, Quality Assurance, app. 1979
- 1986
Lorillard Corp., Greensboro,
N.C./Operations and Research
Division/Director, Product
Development, 1986 - 1987

MEMBERSHIPS: REDACTED

PRESENT ADDRESS: Lorillard Research Center
P.O. Box 21688
Greensboro, NC 27420

RESEARCH: Tobacco smoke chemistry; filtration
efficiency; ignition propensity.
Author of 11 papers given at
Tobacco Chemists' Research
Conferences; additional
publications in the scientific
literature.

*Unofficial biography. Biographical data not available in
standard sources.

2021553868

| Lorillard Corp. | | 1954 | 1953 |
|-------------------|-------------|-------------|-------------|
| New York | | | |
| Operating Results | | | |
| Operating income | \$1,000,000 | \$900,000 | \$800,000 |
| Net income | \$500,000 | \$450,000 | \$400,000 |
| Dividends | \$250,000 | \$225,000 | \$200,000 |
| Retained earnings | \$1,250,000 | \$1,125,000 | \$1,000,000 |
| Assets | \$2,500,000 | \$2,250,000 | \$2,000,000 |
| Liabilities | \$1,250,000 | \$1,125,000 | \$1,000,000 |
| Equity | \$1,250,000 | \$1,125,000 | \$1,000,000 |

Lorillard Corp. sold its most important assets—its cigarette, tobacco and related operations—in a series of transactions over the past few years. It is now a purely financial company, with its assets in the form of cash and securities. The company's assets are valued at \$2.5 billion, and its liabilities at \$1.25 billion. The company's equity is \$1.25 billion.

Lorillard, in the same month, announced by Lorillard National Advertising, Inc. that it had acquired 17.5% of the equity of the company. The company's assets are valued at \$2.5 billion, and its liabilities at \$1.25 billion. The company's equity is \$1.25 billion.

Lorillard's assets are valued at \$2.5 billion, and its liabilities at \$1.25 billion. The company's equity is \$1.25 billion. The company's assets are valued at \$2.5 billion, and its liabilities at \$1.25 billion. The company's equity is \$1.25 billion.

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In the meantime, Lorillard's assets are valued at \$2.5 billion, and its liabilities at \$1.25 billion. The company's equity is \$1.25 billion. The company's assets are valued at \$2.5 billion, and its liabilities at \$1.25 billion. The company's equity is \$1.25 billion.

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Lorillard's assets are valued at \$2.5 billion, and its liabilities at \$1.25 billion. The company's equity is \$1.25 billion. The company's assets are valued at \$2.5 billion, and its liabilities at \$1.25 billion. The company's equity is \$1.25 billion.

2021553869

AMERICAN TOBACCO CORPORATION

SEE THE ATTACHED PROFILE FROM ADVERTISING AGE

American Tobacco is part of American Brands, a large diverse corporation with holdings in sporting goods (golf equipment), distilled spirits (Jim Beam, Cutty Sark), soap and toiletries, and food (Sunshine Biscuits) to mention just a few.

In 1985 American moved its administrative center to Chesterfield County, Va. A total of about 75 of the NY based employees relocated. A \$10 million renovation and construction project was reportedly part of the move. The report mentioned renovation of the 100,500 sq. ft. R&D center and the addition of a 39,840 sq. ft. annex.

In 1986 American announced that all cigarette manufacturing would be done at their Reidsville, N.C. facility. They closed the stemmery in Richmond, Va., indicating that this work would be contracted in the future. Cigarette manufacturing in Richmond was discontinued in 1981.

Also in 1986, American moved their marketing and headquarters operation from N.Y.C. to Stamford, Conn.

American's R&D budget for 1985 was estimated at \$10-12 million.

In 1985 Virginius B. Lougee, III was appointed Chairman and CEO, and Thomas C. Hays President and CO, both of Am. Tobacco Co. Lougee is a graduate of NC State. Hays, who continues as VP of Am. Brands, graduated from Calif. Inst. of Tech. He also has a MBA from Harvard. Lougee recently announced that he will retire at the end of 1987. He will be succeeded by William J. Alley, 57 the company's vice chairman.

Dallas O. Pinion was made Assistant Research Mgr. of the R&D department in 1987. He joined the company in 1968.

American's brands include the Lucky Strike line, Carlton, Pall Mall and Tareyton (charcoal).

2021553870

Table 3. Estimated Results of American Brands, Inc. (dollars in millions)^a

| | 1985 | | 1986(E) | | 1987(E) | |
|---------------------------|---------|-------|---------|-------|---------|-------|
| | Amt(\$) | % Chg | Amt(\$) | % Chg | Amt(\$) | % Chg |
| Revenues | | | | | | |
| Tobacco | | | | | | |
| Domestic | 1,450.0 | 3 | 1,530.0 | 6 | 1,600.0 | 5 |
| International | 2,940.0 | 4 | 3,625.0 | 23 | 3,975.0 | 10 |
| Total tobacco | 4,390.0 | 4 | 5,155.0 | 17 | 5,575.0 | 8 |
| Non-Tobacco | 2,918.3 | 44 | 3,325.0 | 14 | 3,600.0 | 8 |
| Total revenues | 7,308.3 | 17 | 8,480.0 | 16 | 9,175.0 | 8 |
| Operating income | | | | | | |
| Tobacco Products | | | | | | |
| Domestic | 406.2 | 7 | 455.0 | 11 | 480.0 | 5 |
| International | 111.4 | -3 | 155.0 | 39 | 170.0 | 10 |
| Total tobacco | 519.6 | 5 | 610.0 | 17 | 650.0 | 7 |
| Non-Tobacco | 204.5 | -8 | 215.0 | 5 | 230.0 | 7 |
| Total operating income | 724.2 | 1 | 825.0 | 14 | 880.0 | 7 |
| Financial service income | 174.1 | 1 | 176.0 | 1 | 180.0 | 2 |
| Nonoperating income | | | | | | |
| Corporate expense | -28.7 | 10 | -30.0 | 5 | -34.0 | 13 |
| Interest expense | -116.9 | -1 | -109.0 | -7 | -101.0 | -7 |
| Other income(exp.) | -2.0 | NM | 7.0 | NM | 2.0 | -71 |
| Total nonoperating income | -147.6 | 1 | -132.0 | -11 | -133.0 | 1 |
| Pretax earnings | 750.7 | 1 | 869.0 | 16 | 927.0 | 7 |
| Taxes | 329.9 | -1 | 388.0 | 18 | 391.0 | 1 |
| Net income | 420.9 | 2 | 481.0 | 14 | 536.0 | 11 |
| Preferred dividends | 16.7 | -5 | 15.0 | -10 | 14.0 | -7 |
| Net income available | 404.2 | 2 | 466.0 | 15 | 522.0 | 12 |
| Earnings per share | | | | | | |
| Primary | 3.67 | 2 | 4.24 | 16 | 4.83 | 14 |
| Fully-diluted | 3.59 | 2 | 4.20 | 17 | 4.80 | 14 |
| Average shares(millions) | 110.2 | 0 | 109.9 | 0 | 108.0 | -2 |
| Operating margins(%) | | | | | | |
| Tobacco Products | | | | | | |
| Domestic | 28.2 | | 29.7 | | 30.0 | |
| International | 3.8 | | 4.3 | | 4.3 | |
| Total operating margin | 11.8 | | 11.8 | | 11.7 | |
| Nonoperating margin | 7.0 | | 6.5 | | 6.4 | |
| Total operating margin | 9.9 | | 9.7 | | 9.6 | |
| Pretax margin | 10.3 | | 10.2 | | 10.1 | |
| Tax rate | 43.9 | | 44.6 | | 42.2 | |
| Net margin | 5.8 | | 5.7 | | 5.8 | |

— — Estimated and Recent Quarterly Results — —

| 1985 | 1 Qtr | 2 Qtr | 3 Qtr | 4 Qtr |
|--------------------|---------|---------|---------|-------|
| Revenues | 1,731.6 | 1,626.3 | 2,012.9 | 1,938 |
| Pretax income | 191.6 | 164.3 | 206.3 | 189 |
| Pretax margin(%) | 11.1 | 10.1 | 10.3 | 10 |
| Taxes | 83.6 | 78.4 | 91.9 | 76 |
| Tax rate(%) | 43.7 | 47.7 | 44.5 | 40 |
| Net income | 107.9 | 85.9 | 114.4 | 113 |
| Earnings per share | 0.92 | 0.73 | 0.98 | 0.99 |
| 1986(E) | | | | |
| Revenues | 2,111.5 | 1,937.1 | 2,223.8 | |
| Pretax income | 199.5 | 188.7 | 67.8 | |
| Pretax margin(%) | 11.1 | 9.7 | 3.1 | |
| Taxes | 85.1 | 91.1 | 36.2 | |
| Tax rate(%) | 43.7 | 48.3 | 53.4 | |
| Net income | 114.4 | 97.6 | 31.6 | |
| Earnings per share | 0.99 | 0.85 | 1.25 | 0.97 |
| Yr-to-yr % change | 7.1 | 17.2 | 27.6 | -3 |

Source: Company's annual and quarterly reports.

Note: All data are dollar items unless otherwise noted.

NM Not meaningful.

(E) Kidder, Peabody & Co. Incorporated estimates.

(a) Except per-share data.

2021553871

Subject: .ROBERT SHIELDS SPRINKLE, III: A BIOGRAPHY

The following is a complete biography on Robert Shields Sprinkle, III from the AMERICAN MEN & WOMEN OF SCIENCE (1986):

PERSONAL:

REDACTED

EDUCATION:

BS, Emory and Henry College, 1957

WORK HISTORY:

American Tobacco Company/chemist,
1957-63
American Tobacco Company/manager/
product development, 1963-65
American Tobacco Company/supervisor/
new products division, 1965-68
American Tobacco Company/coordinator/
research & development, 1968-76
American Tobacco Company/deputy director/
research & development, 1976-78
American Tobacco Company/director/
research & development, 1978-80
American Tobacco Company/vice-president/
research & development, 1980-present

MEMBERSHIP:

REDACTED

RESEARCH:

Chemistry and composition of tobacco and tobacco smoke; pyrolytic products of combustion; applications of radioactive assay techniques for identification of particulates and gas phase constituents of tobacco smoke; spectroscopy; gas and liquid phase chromatography

EMPLOYMENT CLASS:

Industry

PRESENT ADDRESS:

Office: American Tobacco Company.
Research & Development Department
P. O. Box 899
Hopewell, VA 23860

REDACTED

2021553872

PRESTON HILDEBRAND LEAKE: A BIOGRAPHY

The following is a complete biography on Dr. Preston Hildebrand Leake from the AMERICAN MEN & WOMEN OF SCIENCE (1986), updated from the original search by L. Cook.

PERSONAL:

REDACTED

EDUCATION:

B.S., University of Virginia, 1950
M.A., Duke University, 1953
Ph.D., Duke University, 1954

MAJOR:

Chemistry

WORK HISTORY:

Allied Chemical Corporation, Nitrogen Division/research supervisor/organic chemistry, 1954-60

Albemarle Paper Manufacturing Company/assistant research director, 1960-65

American Tobacco Company/assistant to managing director/research & development, 1965-68

American Tobacco Company/assistant managing director, 1968-70

American Tobacco Company/assistant director/ research & development department, 1970-87

American Tobacco Company/director/ research & development, 1987 -

MEMBERSHIPS:

REDACTED

RESEARCH:

Polycyclic aromatic chemistry; psychorr synthesis; amino acids and cyanuric acid derivatives; polyethylene; sizing; silica fume; specialty and filter papers; tobacco

2021553873

EMPLOYMENT CLASS: Industry

PRESENT ADDRESS: American Tobacco Company
Research & Development Department
P.O. Box 899
Hopewell, VA 23860

2021553874

Top 100 eke out 2.7% ad increase

The leading national advertisers spent \$26.67 billion in total advertising in 1985, up from a restated \$25.97 billion in 1984. Spending broke out into \$14.57 billion, up about 4%, in 11 measured media, representing about 53% of all national expenditures in those media, and \$12.1 billion in unmeasured advertising, up 0.7%.

| American Brands | | Sales | |
|-----------------|--|-------|--|
| New York | | 1984 | |
| 1985 | | 1984 | |
| 1984 | | 1983 | |
| 1983 | | 1982 | |
| 1982 | | 1981 | |
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Richard A. Bartz, dir.-mtg & sales
Roger M. Harnig, field sales mgr
Ernest P. Amaral, mgr-mail accts
Jack W. Wapner, mgr-mail accts

Advertising Agency
Humphrey Browning MacDougall/Cramer, Boston—John McNamara, acct super-golf div; Marty Curran, acct super-rubber div.

PERKENTON'S

New York

Marketing Personnel
C. Gahrman Holland, sr vp, sales & mtg
Advertising Agency

Douglas J. Turner, Newark, N.J.—
Douglas J. Turner, acct super.
ANDREW JENSEN CO.
Cleveland

Marketing Personnel

Robert L. Don, tust vp-mtg
Reiger V. Reed, vp-mtg
Linda D. Conell, vp-new prod devel
D. Tim Zimmerman, dir-prod mgmt
Richard R. Cahill, vp-sales

Advertising Agency

Ally & Gargano, New York—Jorgeus Ison, Jergens Aloe & Lantolin lotion, Jergens mild soap, Jergens Aloe & Lantolin soap, Jergens lotion-creamed liquid soap, Gentle Touch soap, plus a general line of toiletries & cosmetics—Donna Visach, sr vp-group acct super; Charles McMahon, vp-group super; Peter Feibich, acct super.

SWINGLINE INC.

New York

Marketing Personnel

David B. Miller, vp-sales & mtg
John Sheridan, dir-sales & mtg, business machines div

Fred Weiss, vp-mtg devel & admin
Jack Shulman, vp-sales, office prod div
Anne Bernit, mtg services mgr, office prod div

John Peters, aspen mgr

William Gibbons, suit sales mgr, consumer prod & retail suitcases div
Anne Bernit, mtg services mgr, consumer prod & retail suitcases div

Advertising Agency

Al Paul Lohan Co., New York—G. William Wolfson, president-genl super; Robert H.D. Ellis, vp

MCM PRODUCTS

Old Greenwich, Conn.

Corporate Personnel

Marketing Personnel

R.P. Truitt, president-gen.
David Roberts, suit sales mgr, W.A. Case & Sons Cutlery Co.

Richard B. Turner, vp-sales, professional div, Maroon Corp.

Robert M. Hewson, vp-sales, consumer/marketing div, Maroon Corp.

Craig M. Meyers, vp-sales, summer div, Maroon Corp.

Paul Greenberg, vp-sales & mtg, Marvel Lighting Corp.

Advertising Agencies

McDougall Associates, Peabody, Mass.—Maroon Corp.—Dan McDougall, president.
Paul, Prida & Perry Ltd.—Maroon Corp.—K.E. McFarney, president.

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LIGGETT GROUP, INC.

Liggett Group, Inc., formerly Liggett & Meyers Tobacco Co., became a division of Grand Metropolitan Ltd., another large conglomerate. In 1986 GrandMet sold Liggett to Bennett S. LeBow, a N.Y. based investor. The purchase price was reported to be \$137 million. LeBow has no previous experience in the tobacco industry. Liggett, the smallest of the major U.S. cigarette manufacturers, has in recent years relied mainly on business in the generic and private label sectors.

Robert E. Gillis, a partner of LeBow, will become chairman of Liggett Group Inc. and K.v.R. Dey will remain president and CEO.

In 1987 Liggett announced layoffs of more than 100 hourly manufacturing employees, saying the cutbacks were necessary because of reduced cigarette sales.

2021553877

Subject: .ROBERT LEE KERSEY, JR.: A BIOGRAPHY

The following is a complete biography on Robert Lee Kersey, Jr. from the AMERICAN MEN & WOMEN OF SCIENCE (1986):

PERSONAL:

REDACTED

EDUCATION:

BS, University of Richmond, 1948

WORK HISTORY:

Standard Oil Company of Indiana/
assistant project chemist,
1948-53
Liggett & Myers Tobacco Company/
chemist, 1953-65
Liggett & Myers Tobacco Company/
special assistant to director
of research, 1965-70
Liggett & Myers Tobacco Company/
manager/product development,
1970-75
Liggett & Myers Tobacco Company/
director/research, 1975-78
Liggett & Myers Tobacco Company/
vice-president, 1978-present
Liggett & Myers Tobacco Company/
chief research officer, 1981-
present

MEMBERSHIPS:

RESEARCH:

REDACTED
REDACTED
Tobacco and tobacco products research
and development

EMPLOYMENT CLASS:

Industry

PRESENT ADDRESS:

Liggett & Myers Inc.
Research Department
West Main Street
Durham, NC 27702

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MAJOR U.S. TOBACCO PRODUCTS MANUFACTURERS

Cigarettes

The American Tobacco Company, (subsidiary of American Brands, Inc.),
Executive Offices: Six Stamford Forum, P.O. Box 10380, Stamford, Connecticut
06904-2380. Telephone: 203-325-4800. Telex: 643-674. Personnel: Thomas C.
Hays, president and chief executive officer; Cleveland C. Kern Jr., senior vice
president-operations; Charles H. Mullen, senior vice president-sales; William J.
Moore, vice president-advertising; Richard H. Morrison, vice president-manufac-
ture and leaf; Robert S. Sprinkle, III, vice president-research and development;
James H. Wells, vice president-field sales; Vivian A. Parks, Jr., vice-president
and controller; Dudley L. Baverfahn, Jr., treasurer; Robert M. Bause, leaf pur-
chases director; Durham, N.C.: Gerard K. Coffey, purchasing director, Rich-
mond, Va.; John H. Heger, leaf services director, Richmond, Va. Plant locations:
Pettigrew and Blackwell Streets, Durham, N.C. 27701-3624, John W. Tucker,
manager. Telephone: 919-682-2101. N. Scales Street, Raleigh, N.C.
27320-2906, L.M. Tiley, manager. Telephone: 919-349-6261. 2009 East Grace
Street, Richmond, Va. 23223-7062. W.E. Gates, Jr., manager. Telephone:
804-643-2821. Principal cigarette brand: Pall Mall, Lucky Strike, Tarayon,
Carton, Silva Thin.

Brown & Williamson Tobacco Corp., Executive offices: 1500 Brown & Wil-
liamson Tower, Louisville Galleria, P.O. Box 35090, Louisville, Kentucky 40232.
Telephone: 502-586-7000. Telex: 204115. Cable: BROWNSONLVL. Personnel:
R.J. Pritchard, chairman and chief executive officer; T.E. Sanderfur, Jr., president
and chief operating officer; W.L. DeWitt, senior vice president; B.M. Lowden-
back, senior vice president-human resources; E. Pepples, senior vice president
and general counsel; C.J. Heger, senior vice president, finance; T.E. Whitehair,
vice president-corporate marketing; C.J. Dunn, consultant; J.S. Hekewicz, vice
president-corporate communications; H.A. Roeder, vice president-manufactur-
ing and leaf processing; R.H. Sachs, vice president-law and deputy general
counsel; E.E. Kohnfort, vice president research development and engineering.
Plant locations: 600 N. Chestnut Street, Winston-Salem, North Carolina 27102.
E.T. Parrack, Jr., vice president and general manager. Telephone:
919-722-5125. 2600 Weaver Road, Macon, Georgia 31202. R.G. Hawkins,
branch manager. Telephone: 912-743-0561. Leaf processing plant d/b/a Export
Leaf Tobacco Company: Old Stantonburg Road, Wilson, North Carolina 27893.
C.M. Gibbs, branch manager. Telephone: 919-291-4700. Products: cigarettes,
smoking tobacco, pipe tobacco, chewing tobacco, snuff. Principal cigarette
brands: Barclay, Belfar, Kool, Raleigh, Richland, Viceroy.

G.A. Georgopulos & Co., Inc., 48 Stone St., New York, New York 10004.
Telephone: 212-425-7048. Telex: 228238. Cable: GEORGOPO. Products: cigs-
rettes and small cigars, importers of cigarettes and tobacco products. Principal
brand: Rameses II, Turkish Special, Andron.

Larue & Brother Co., Inc., House of Edgeworth, 5721 South Laboratory Ave.,
Richmond, Virginia 23231. Telephone: 804-222-3990. Cable: EDGEWORTH.
Personnel: W. Brooks George, chairman of the board; R.S. Pless, president and
chief executive officer; H.B. Robelen, secretary-treasurer. Manufacturers, im-
porters, distributors. Principal brands: Rothmans; pipe tobacco — Edgeworth,
Holiday.

Liggett Group Inc., Liggett & Myers Tobacco Co., Main & Fuller Streets,
Durham, North Carolina 27702. Telephone: 919-683-9000. Telex: 579407. Per-
sonnel: K.V. Dey, Jr., president and chief executive officer; Joseph S. Murray,
vice president, general counsel and secretary; David M. Welsh, vice president,
finance; James C. Turner, vice president, product assurance & operations; Har-
old A. Grant, vice president, sales & marketing; Donald E. Mott, vice president,
personnel & employee relations; Robert L. Kersey, Jr., vice president, research,
products; cigarettes. Principal brands: L & M, Chesterfield, Lark, Eve, Generics/
Private labels.

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Lorillard, Executive Offices: (Attn. S. Ridgway) 666 Fifth Ave., New York, New York 10103. Telephone: 212-941-8500. Personnel: J. Robert Ave, president, chief executive officer; Alexander W. Spears, executive vice president-operations & research; Richard H. Orcutt, senior vice president-sales; Dewey R. Tedder, senior vice president, leaf & support services; Arthur J. Stevens, senior vice president-general counsel; M. Alfred Peterson, senior vice president-finance; Joseph P. Mastandrea, vice president-sales; Lou Gordon, vice president-trade development; Sara R. Ridgway, vice president-public relations; Louis E. Burch, director-leaf purchasing; Thomas H. Mau, senior vice president, advertising and brand management; Roger P. Edwards, vice president, manufacturing. Operations center: 2525 East Market St., Greensboro, N.C. 27401 - A.W. Spears, executive vice president-operations and research; Dewey R. Tedder, senior vice president-leaf and support services; Fred J. Schultz, vice president-research and development; Roger B. Edwards, vice president-manufacturing. Louis E. Burch, director-leaf purchasing. Plant locations: 2525 East Market St., Greensboro, N.C. - Major Bowes, general manager; 3029 Muhammad Ali Blvd., (Mail Box 1018), Louisville, Ky. 40212 - Gene Rains, general manager; Old Hallfax Road, (Mail Box 3200), Danville, Va. 24541 - Lawrence W. Ammons, general manager. Products: cigarettes, cigars, chewing tobacco. Principal brands: (cigarettes) Kent Filter, Kent Filter Box, Kent Filter 100s, Kent III Filter, Kent Filter 100s (Menthol), Kent III 100s, Kent III Box 100s, Kent Golden Lights Filter, Kent Golden Lights Filter (Menthol), Kent Golden Lights Filter 100s, Kent Golden Lights 100's (Menthol), Newport Filter (Menthol), Newport Lights Filter (Menthol), Newport Filter Box (Menthol), True Filter, True Filter (Menthol), True Gold Filter Box, Kings & 100s, Satin Filter, Satin Filter (Menthol), Triumph Filter, Triumph Filter (Menthol), Old Gold Filter, Old Gold Lights Filter, Old Gold Straight, Spring Filter (Menthol), Max Filter, Max Filter (Menthol) - (All Filter) Kent Golden Lights Box 80s, Kent Golden Lights Box 100s, Newport 100s, Newport Box 100s, Newport Lights 100s, Newport Lights Box 80s, Newport Lights Box 100s, Newport 25s, Newport 25s & 100s.

Luckett Tobaccos Inc., 222 So. First St., Suite 304, Louisville, Kentucky 40202-1361. Telephone: (502) 562-9263. Telex: 204153. Personnel: William R. Meyer, president. Plant location: Compagnie Des Tabacs Comme il Faut, P.O. Box 797, Port au Prince, Haiti. category of business: wholesale exporter.

Park Avenue Tobacco, Inc., 1000 Jefferson Davis Highway, Richmond, Virginia 23224. Telephone: (804) 233-8108. Telex: 9103805282. Personnel: James Dowd, president and CEO; Roy Jorstad, executive vice president, marketing; Larry Singleton, director of marketing. (Associated with Reintama International GmbH, Hamburg, West Germany). Products: cigarettes. Principal brands: West, Astor, Delta, 1776, Knightsbridge.

Philip Morris Companies Inc., Executive Offices: 120 Park Ave., New York, New York 10017. Telephone: 212-880-5000. Telex: 212 878-2996. Personnel: Hamish Maxwell, chairman of the board and chief executive officer; John A. Murphy, president; Hugh Cullman, vice chairman of the board; R. William Murray, vice chairman of the board; James L. Ferguson, vice chairman of the board; Frank E. Resnik, vice president-Philip Morris Inc.; president and chief executive officer - Philip Morris U.S.A.; Philip L. Smith, vice chairman of the board; Thomas F. Ahrensfeld, senior vice president and general counsel; Stanley S. Scott, vice president, director of corporate affairs; Eugene J.T. Flanagan, vice president, secretary, and associate general counsel; William K. Howell, president and chief executive officer-Miller Brewing Co.; Elrud Hounthuer, senior vice president, planning; William I. Campbell, vice president-Philip Morris Inc.; executive vice president, marketing-Philip Morris U.S.A.; Geoffrey C. Bible, president and chief executive officer-Philip Morris International; William J. O'Connor, senior vice president, administration and human resources; George R. Lewis, vice president and treasurer; Philip J. Reilly, president and chief executive officer-Mission Viejo Realty Group Inc.; Carlos E. Salguero, vice president-Philip Morris Inc.; executive vice president-Philip Morris International; R. Nelson Beane, vice president and controller-Philip Morris Companies Inc.; Richard L. Snyder, vice president-Philip Morris Inc.; executive vice president-Philip Morris International; Hans G. Storr, senior vice president, chief financial officer-Philip Morris Companies Inc.; Alexander Holtzman, associate general counsel; vice president and general counsel-Philip Morris U.S.A.; Bruce S. Brown, staff vice president and director, taxes-Philip Morris Companies Inc.; Gene A. Knorr, staff vice president, Wash-

region relations-Philip Morris Companies Inc.; F. Robert Kurmsky, staff vice president, information and communications services-Philip Morris Companies Inc.; William C. Smy, staff vice president and general auditor-Philip Morris Companies Inc.; William K. Trause, staff vice president, personnel-Philip Morris Companies Inc.; Mark A. Serrano, vice president-Philip Morris Inc.; executive vice president, operations-Philip Morris U.S.A.; James T. Bredlove, assistant secretary, Philip Morris Companies Inc. Philip Morris U.S.A. Executive offices and officers listed above with the following additions: Fred J. Laux, senior vice president, personnel; Albert J. Bismeyer III, vice president, business development; W. John Campbell, senior vice president, plant operations; Vincent J. Buccellato, vice president, sales; O. Wilcher Duxley, vice president, leaf; John J. Gillis, senior vice president, trade development; Dr. Kenneth S. Houghton, vice president, research and development; Harry G. Steele, vice president, finance and administration; Guy L. Smith, IV, vice president, corporate affairs; George W.B. Taylor, vice president, engineering; James L. Thompson, Jr., vice president, media; Horace P. Jones, controller; David Dangoor, vice president, brand/promotions; Edwin J. McQuigg, vice president-sales development; Lawrence W. Zinski, vice president-field sales; Philip Morris International. Executive offices and officers listed above with the following additions: John E. Kramer, Jr.; director of finance and treasurer; Frank T. Toccano, controller; Elizabeth Butson, vice president marketing services; Alvaro G. Buzzi, president, EEC; Dryar Devitre, president, PM Asia; Marc Goldberg, executive vice president LA/I; Richard A. Hutchinson, Jr., senior vice president LA/I; Thomas M. Keama, vice president, finance; Lee Pollak, vice president; Bernard Beaupere, vice president, personnel; Walter Thoma, president, EEMA; William H. Webb, managing dir, PM Australia; Andrew Whit, vice president, corporate affairs; Martin D.J. Buss, vice president, international planning. Factory Locations: Richmond Mfg. Center-3601 Commerce Road (Mail: P.O. Box 26603), Richmond, Va. 23234. Telephone: 804-274-2000. Personnel: W. John Campbell, senior vice president, plant operations; Ronald A. Lively, general manager, manufacturing; Richmond, Louisville Plant-1930 Maple Street (Mail: P.O. Box 1498), Louisville, Ky. 40201. Telephone: 502-566-1234. Personnel: William R. Moore, general manager, manufacturing—Louisville. Cabernus Plant-3321 Highway 29 South (Mail: Box 1098), Concord, N.C. 28025. Telephone: 704-769-5000. Personnel: Newton O. Fowler, general manager Cabernus operations. Research & Development Center-4201 Commerce Road, Richmond, Va. 23234. Personnel: Dr. Kenneth S. Houghton, vice president, research and development; Dr. Thomas S. Osdenre, Director, science and technology. Products: cigarettes. Principal brands: Marlboro, Ment, Benson & Hedges 100's, Virginia Slims, Parliament Lights, Cambridge, Players, Saratoga, Philip Morris Commander, English Oaks.

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R.J. Reynolds Tobacco Co., Subsidiary of R.J.R. Nabisco, Inc., Has 2 Operating Units, R.J. Reynolds Tobacco USA and R.J. Reynolds Tobacco International, 401 North Main St., Winston-Salem, North Carolina 27102. Telephone: 919-777-5000. Telex: 806-483. Cable: use Winston-Salem Address. Personnel: E.A. Horrigan, Jr., chairman and CEO-R.J. Reynolds Tobacco Co.; G.H. Long, president and CEO-R.J. Reynolds Tobacco USA; F.H. Christopher, executive vice president, manufacturing and technology-R.J. Reynolds Tobacco Co.; R.A. Emken, executive vice president-R.J. Reynolds Tobacco USA; R. Angioli, president, R.J. Reynolds Tobacco USA-sales and distributor; R.B. Beasley, vice president, field sales-R.J. Reynolds Tobacco USA; R.E. Clements, senior vice president, leaf buying-R.J. Reynolds Tobacco USA; G. Robert DiMarco, senior vice president, research and development-R.J. Reynolds Tobacco USA; J.B. Dempster, vice president, materials management-R.J. Reynolds Tobacco USA; Y.W. Ford, Jr., vice president, field sales-R.J. Reynolds Tobacco USA; J.J. Gangloff, vice president finance and chief financial officer-R.J. Reynolds Tobacco USA; L.W. Hall, Jr., vice president, marketing development-R.J. Reynolds Tobacco USA; R.A. Kampe, president-R.J. Reynolds Tobacco Development Co.; Clyde W. Fitzgerald, senior executive vice president-R.J. Reynolds Tobacco USA; C.E. Snyder, vice president, production-R.J. Reynolds Tobacco USA; J.R. Trulove, vice president, distribution-R.J. Reynolds Tobacco USA; Victor M. Lynn, senior vice president-business planning-R.J. Reynolds Tobacco Co.; Joe F. Morgan, vice president-engineering and facilities development-R.J. Reynolds Tobacco Co.; Wayne W. Juchatz, senior vice president and general counsel-R.J. Reynolds Tobacco Co.; David B. Fahel, vice president, public relations; W. Eugene Aneworth, Jr., vice president, government relations-R.J. Reynolds Tobacco USA; M.E. Butcher, assistant manager, leaf processing and storage division-R.J. Reynolds Tobacco USA; Marvin R. Martin, vice president, information resources-R.J. Reynolds Tobacco USA; W.G. Entos, Jr., director, purchasing-R.J. Reynolds Tobacco USA; J.T. Weinbrenner, senior vice president, marketing-R.J. Reynolds Tobacco USA; D.K. Isblaster, vice president, manufacturing-R.J. Reynolds Tobacco USA; T.J. Sullivan, vice president, trade relations-R.J. Reynolds Tobacco USA; K.J. Keiser, group director, purchasing-R.J. Reynolds Tobacco USA; W.W. Kibler, Jr., group personnel director, operations-R.J. Reynolds Tobacco USA; W.E. Moffitt, personnel director, production/quality assurance-R.J. Reynolds Tobacco USA; D.P. Montgomery, vice president manufacturing engineering-R.J. Reynolds Tobacco USA; E.N. Monahan, vice president, planning-R.J. Reynolds Tobacco USA; R.L. Morgan, director, quality assurance-R.J. Reynolds Tobacco USA; G.T. Baroody, group director, marketing services-R.J. Reynolds Tobacco USA; Tom Ogbum, director, public relations-R.J. Reynolds Tobacco USA; R.R. Gordon, Jr., vice president, personnel; W.M. Hildeboff, vice president, research and development-R.J. Reynolds Tobacco USA; G.W. McKenna, vice president-marketing planning-R.J. Reynolds Tobacco USA. Products: Reynolds Tobacco USA manufactures more than 50 brands in the U.S. in one major tobacco product classification: cigarettes. Cigarettes: Bright 100s (menthol), Camel Regular (non-filter), Camel Filters, Camel Filters Hard Pack, Camel Lights, Camel Lights Hard Pack, Camel Lights 100s, Century Filters, Century Filters 100s, Century Lights, & Century Lights 100s, 100s Menthol, Doral Ultra Lights 100s, Doral Full Flavor 85s, Doral Full Flavor 100s, More, More Menthol, More Lights 100s (box), More Lights 100s Menthol (box), Now Filter, Now Box, Now Menthol, Now 100s Filter, Now Filter 100s Box, Now 100s Menthol, Ritz 100s (box), Ritz 100s Menthol (box), Salem, Salem 100s (menthol), Salem Lights (menthol), Salem Lights 100s (menthol), Salem Ultra (menthol), Salem Ultra 100s (menthol), Salem Slim Lights 100s (menthol; box), Salem Lights 100s (box), Vantage Filter, Vantage Menthol, Vantage 100s, Vantage 100s Menthol, Vantage Ultra Lights, Vantage Ultra Lights 100s, Winston, Winston Box, Winston 100s, Winston Lights, Winston Lights 100s, Winston Ultra Lights, Winston Ultra Lights 100s, Winston Lights 100s box, Winston Lights box. R.J. Reynolds Tobacco International, Inc. the international operating unit of R.J. Reynolds Tob. Co., a subsidiary of R.J.R. Nabisco, Inc., Reynolds Plaza Complex, 401 North Main St., P.O. Box 2859, Winston-Salem, N.C. 27102. Telephone: 919-777-5000. Telex: 806483 RJRTII WSL. Cable: REYNOLDS WINSTON-SALEM. Personnel: Lester W. Pullen, chairman and chief executive officer; Lester W. Pullen, chairman and CEO; Dale F. Sisal, president; Klaus D. Langner, executive vice president; Locke M. Newlin, executive vice president; Edward J.

Lang, executive vice president; Howard M. Barwell, vice president, marketing; Wolfgang D. Dahne, vice president, research & development; H. Gene Wick, vice president, operations; Charles H. Jennings, senior vice president, human resources; Richard J. Marcotullio, vice president, public affairs; Japp Littenborg-aard, vice president and chief financial officer; Peter J. Van Every, vice president general counsel and secretary. Headquarters and plants worldwide: R.J. Reynolds Tobacco International, S.A., 12-14 Chemin Fleu, 1211 Geneva 17, Switzerland; R.J. Reynolds Tobacco GmbH, Maria-Abliss Platz 15, P.O. Box 100 885, D-5000 Cologne 1, West Germany; Berlin plant, 12-21 Waldestrasse, P.O. Box 22, D-1000 Berlin 51, Germany; Trier plant, Dietherhofener Strasse, Hols-triegelande Moravia, P.O. Box 4060, D-5500 Trier, West Germany. N.Y.R.J. Reynolds Tobacco/Gossett S.A., 6 rue Gabrielle Petit, Strati 6, Bruxelles 1020, Belgium; R.J. Reynolds Tobacco France S.A. 171, avenue Charles de Gaulle, 92521 Neuilly-sur-Seine Cedex, France; R.J. Reynolds Tobacco Espana, S.A., Oficina de Representacion para Espana, Marques de Villamejor 6-8, 28001 Madrid, Spain; Canary Islands plant, R.J. Reynolds Tobacco Company, S.A.E., El Paso, Island of La Palma, Canary Islands, Spain; R.J. Reynolds (Portugal)-Empresa Comercial de Tabacos Lda, rua dos Soeiros no. 338-4-Esq., 1500 Lisbon, Portugal; R.J. Reynolds Tobacco (Hellas) A.E.B.E., 2-4 Mesogion Ave., Athens Tower "A", 5th Floor, Athens 11527, Greece; R.J. Reynolds Tobacco B.V., Vreeslandseweg 46, 1216 CH, Hiverum, The Netherlands; R.J.R. Nabisco Divisione Taba Cchi S.p.A., Via Correggio 19, 20149 Milano, Italy; R.J. Reynolds Tobacco A.B., Kanaltvegen 15, S-163 30 TAEBY, Sweden; R.J. Reynolds Tobacco AG Degersheim, CH-6252 Degersheim/LU, Switzerland; R.J. Reynolds Tobacco Int'l (U.K. office), Del Monte House, 240 London Road, Slanes, Modetsex TW18 4JD, United Kingdom; R.J.R.-Macdonald Inc., One First Canadian Place, Toronto, Ontario, Canada M5X 1E6; Montreal plant, 2455 Ontario Street East, Montreal, Quebec, Canada H2K 1W3; Tilsonburg leaf processing, P.O. Box 310, No. 3 Highway West, Tilsonburg, Ontario, Canada N4G 4H8; R.J. Reynolds Tobacco Co. - Puerto Rico, De Diego Expressway, Buchanan Exit State Road 165, GPO Box 3509, San Juan, Puerto Rico 00936; Puerto Rico plant, Highway 3 KM 90.4, Box 369, Yabucoa, Puerto Rico 00767-0070; R.J. Reynolds Tabacos do Brasil Ltd., Praia de Botafogo 228, 13th Floor, Caixa Postal 62570, 22257 Rio de Janeiro, Brazil; Santa Cruz do Sul plant, Rua Assis Brasil 983, Caixa Postal 390, 96600 Santa Cruz do Sul, Rio Grande do Sul, Brazil; Santa Cruz do Sul leaf processing, BR 471, Distrito Industrial de Da. Carota, 96800 Santa Cruz do Sul, Rio Grande do Sul, Brazil; Fabrica de Cigarillos El Progreso S.A., Amazonas 3123 Via Azuay, Casilla 17, Quito, Ecuador; Guayaquil leaf processing, Fabrica de Cigarillos El Progreso, S.A., Casilla 193 Guayaquil, Ecuador; R.J. Reynolds Tobacco Co. (H.K.), Ltd., 7th & 25th Floors, Sun Hung Kai Centre, 30 Harbour Road, Wanchai Hong Kong; R.J. Reynolds Tobacco Co. Sdn. Bhd., Bangunan British-American, Jalan Se-mantan, Damansara Heights, P.O. Box 11066, Kuala Lumpur, Malaysia; Kuala Lumpur plant, Persiaran Raja Muda, P.O. Box 37, Shah Alam Industrial Estate, Selangor, Malaysia; R.J. Reynolds Tobacco Australia, Inc., Northport, Suite 2401, Level 24, 100 Miller Street, P.O. Box 1325, North Sydney, NSW 2060, Australia; R.J. Reynolds/M.C. Tobacco Co., Minami Aoyama 22, Dai-kyo Bldg., 3rd Floor, 3-6 Minami Aoyama 7-Chome, Minato-Ku, Tokyo 107, Japan; R.J. Reynolds Tobacco International (Asia/Pacific), Inc., c/o Thong Huet Importers & Exporters Pte. Ltd., Suites 1207-1209, 12th Floor, Shenton House, Shenton Way, Singapore 0106, Singapore; R.J. Reynolds Tobacco International, Inc., c/o Bordallo Consolidated Inc., P.O. Box 3237, Agaña, Guam 96910, Xiamen Cigarette Factory, 18 Hu Yuan Road, Xiamen, People's Republic of China, R.J.R. Nabisco China, Sun Hung Kai Centre, 30 Harbour Road, Wanchai, Hong Kong. Products: cigarettes, cigars, smoking tobacco.

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Nat Sherman Company, 711 Fifth Ave, New York, New York 10022. Telephone: 212-751-9100. Personnel: Nat Sherman, chief operations officer; Ron Filmore, director of operations. Plant address: 629 W. 54th St., New York, N.Y. 10019. Telephone: 212-592-0278/9. Manufacturers, Importers, distributors. Principal brands: Nat Sherman, Cigarettellos, Cigarettellos Lights, Cigarettellos Filter King, Cigarettellos Filter Queen, MCD, MCD Lights, Natural Filter, Natural Lights, Slims, Slim Lights, Clove, Mint, Virginia Circles, Virginia Circles Filter, Virginia Circles Lights, Havana Ovals, Havana Rounds Filter, Havana Rounds Lights, Turkish Ovals, Turkish Rounds Filter, Turkish Rounds Lights, Phantom Filter, Jubilee Lights-Gold Filter Tip, Casinos, Cigarettellos Long Filter Tipped, MCD Doubles Filter Tipped, Fantasia Gold Filter Tipped, Casinos "333" Filter Tipped, #164 Non-Filter.

Tobacco Exporters International (USA) Ltd., 2280 Mountain Industrial Boulevard, Tucker, Georgia 30084. Telephone: 404-493-1489. Telex: 281394 TEIAUR. Cable: EDGEWORTH ATL. Importers and distributors of cigarettes. Principal brands: Dunhill, Craven "A", Rothmans, St. Moritz.

West Park Tobacco, Inc., 1100 Jefferson Davis Highway, Richmond, Virginia 23224. Telephone: 804-233-5300. Telex: 510100 3438 (WESTPARK RIC). Personnel: Peter Kortmeyer, president. (Associated with Reemtsma International GmbH, Hamburg, West Germany.). Products: cigarettes. Principal brands: West, Delta, 1776, Knightsbridge, Astor.

PATENTS ASSIGNED TO MAJOR CIGARETTE PRODUCERS

LEGEND: tobacco patents (class 131)/total patents issued

| <u>COMPANY</u> | <u>1985</u> | <u>1984</u> | <u>1983</u> | <u>1982</u> | <u>1981</u> | <u>1980</u> |
|----------------|-------------|-------------|-------------|-------------|-------------|-------------|
| B&W | 20/28 | 10/12 | 6/7 | 12/16 | 7/9 | 4/6 |
| RJR | 8/20 | 2/6 | 2/4 | 1/5 | 2/8 | 0/2 |
| PM | 26/35 | 14/21 | 14/19 | 18/33 | 19/25 | 7/21 |

OTHER COMPANIES LISTED UNDER CLASS 131- TOBACCO PATENTS INCLUDED:
HAUNI, MOLINS GD AND IFF IN ADDITION TO THOSE LISTED ABOVE

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SUMMARY OF PUBLICATIONS BY COMPETITORS

| SUBJECT AREA | <u>R.J. Reynolds.</u> | | | <u>Lorillard</u> | | | <u>Brown & Williamson</u> | | | <u>Japan Tobacco Inst.</u> | | |
|------------------------------------|-----------------------|------|------|------------------|------|------|-------------------------------|------|------|----------------------------|------|------|
| | 1984 | 1985 | 1986 | 1984 | 1985 | 1986 | 1984 | 1985 | 1986 | 1984 | 1985 | 1986 |
| General Chemistry | | 3 | 3 | | | 1 | | | | 11 | 2 | 3 |
| Tobacco Chemistry | 1 | 2 | 1 | | | | | | | 3 | 9 | 4 |
| Smoke: Chemistry & Taste | | | 1 | | | | | | | 6 | 6 | 1 |
| Alkaloids | | | | | | | | | | | | 1 |
| Physiology | 1 | | 2 | | | | | | | | | 1 |
| Biological Activity | | | | | 1 | | | | | 12 | 14 | 13 |
| Biochemistry & Biotechnology | | | | | | | | | | 14 | 13 | 8 |
| Filtration | | | | 1 | | | | | | 1 | 1 | |
| Fire Safety | | | | | | 1 | | | | | | |
| Tobacco Growing, Storing, Pests | | | 2 | | | | | | | 4 | 3 | 4 |
| Processing | | | | | | | | 1 | | 3 | 2 | |
| Product Testing | 1 | | | | | | | | | | | |
| Miscellaneous | | | | 1 | | 1 | 2 | | 1 | | 1 | 2 |
| TOTALS | 3 | 5 | 9 | 2 | 1 | 3 | 2 | 1 | 1 | 54 | 51 | 37 |

Publications were assigned to rather arbitrary groups on the basis of title and/or journal.
Source: "Competitors Database," R&D Technical Information Section, C. McDonald.

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PHILIP MORRIS, INC.'S
NORTH AMERICAN TOBACCO COMPANY COMPETITORS
AND THEIR SUBSIDIARIES

AMERICAN BRANDS INC. (formerly American Tobacco Co.)

| <u>Subsidiary</u> | <u>Product/Service</u> |
|--|---|
| ABCO Inc. | solid waste incineration |
| Acme Visible Records, Inc. - | storage and retrieval systems |
| Achushnet Co. - | TITLEIST golf balls, other golf products and equipment, PINNACLE products, FOOT-JOY, Inc. - golf shoes, gloves street shoes and footwear for other sports |
| Beam (James B.) Distilling - | JIM BEAM bourbon whiskey BEAM'S CHOICE bourbon whiskey NATIONAL DISTILLERS AND CHEMICAL CO. |
| *Buckingham Corp. - | importers of CUTTY SARK scotch |
| Case (W.R.) & Sons Cutlery | |
| Franklin Life Insurance - | individual insurance policies - life, home, auto, etc. |
| Gallaher - a tobacco unit - | B&H SPECIAL FILTER SILK CUT OLD HOLBORN |
| Golden Belt Manufacturing Co. - | foil laminating operation |
| Jergens (Andrew) - | JERGENS soaps and lotions, GEE, YOUR HAIR SMELLS TERRIFIC shampoo and conditioner, BARBIE toiletries for children, NATURE SCENTS soap, WOODBURY soap |
| Marvel Lighting Co. - | incandescent and fluorescent lamps |
| Master Lock Co. | |
| National Distillers and Chemical Corp. | |
| MCM Products Inc. - | cutlery, electrical and incandescent lights, office and auto repair products |
| Pinkerton's Inc. - | security service |

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Southland Life Insurance Co. - group and individual insurance policies -
life, health and disability

Sunshine Biscuits - cookies and crackers -
CHEEZITS,
HI HO,
KRISPY,
HIDROX

Swingline - staplers, fastening tools, chemical
adhesives, specialty items for the
automotive industry and industrial
fastening devices

Wilson Jones Co. - business books

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BROWN & WILLIAMSON INDUSTRIES (formerly Brown & Williamson Tobacco Corp.)

| <u>Subsidiary</u> | <u>Product/Service</u> |
|----------------------|---|
| Aleutian King Crab - | largest processor of Alaskan crab meat |
| *Gimbels - | department stores |
| *Kohl Corp. - | a supermarket, drugstore, bakery, department store, liquor and thrift store chain in Wisconsin and Illinois |
| Saks-Fifth Avenue - | department stores |
| Sea Pass - | frozen seafood plant |
| *Vita Foods - | packer and importer of gourmet foods including caviar, sardines, kosher foods, maraschino cherries. |

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IMASCO LTD. (formerly Imperial Tobacco Co. of Canada)

| <u>Subsidiary</u> | <u>Product/Service</u> |
|-------------------------------|--|
| Burger Chef | |
| Fast Food Merchandiser's Inc. | |
| Hardees | |
| Imperial Tobacco Products - | cigarettes and cigars - DUNLOP PLAYERS |
| Koffler Stores - | drugstores and drycleaning outlets |
| People's Drug Stores | |
| *Progresso - | PROGRESSO frozen and canned foods |
| Shopper's Drug Mart - | Canadian based drugstore chain |

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*LIGGETT GROUP, INC. (formerly a division of Grand Metropolitan Ltd.)

| <u>Subsidiary</u> | <u>Product/Service</u> |
|------------------------------|---|
| Allen Products - | ALPO dog food, biscuit snacks for dogs - LIV-A-SNAPS, BEEF-SNAPS, CHICK-N-SNAPS |
| *Austin-Nichols - | importer, bottler, rectifier and distributor of alcoholic beverages - WILD TURKEY bourbon whiskey, GRANT'S Scotch whiskey, METAXA Greek brandy, CAMPARI Italian aperitif, and others |
| *Brite Industries, Inc. - | watchbands |
| Carillon Importers, Ltd. - | import GRAND MARNIER, BOMBAY gin, BOMBAY vermouth and a variety of wines, brandies and cordials |
| Earl Grissmer - | BLUE LUSTRE household cleaning products - carpet shampoo, furniture polish, upholstery cleaner, vacuum cleaner bags, glass cleaner |
| Eilebrecht Zigaretten - | W. German cigarettes and cigars |
| Leach Industries, Inc. - | wholesale liquor distributor |
| Mercury Mills - | prepackaged room-sized rugs sold in major retail stores |
| *National Oats, Inc. - | packaged cereals - CREAM OF OATS, INSTANT CREAM OF OATS, 3 MINUTE CEREALS, 3 MINUTE POPCORN, CORNCO animal foods |
| Paddington Corp. - | exclusive importer of J&B scotch whiskey |
| Pepsi-Cola Bottling Co. Inc. | |
| Western Dairy Products - | importer and producer of dairy products |

2021553893

LORILLARD CORPORATION (formerly Lorillard Co.) now a division of Loew's
Theatres, Inc.

| <u>Subsidiary</u> | <u>Product/Service</u> |
|------------------------------|--|
| Golden Nuggett Candy Co. - | LOOK candy bars, BIG HUNK candy bars (distributed primarily west of Mississippi) |
| *Reed Candy Co. - | REED hard candy |
| *Schenley Industries, Inc. - | ANCIENT AGE, I.W. HARPER, SCHENLEY RESERVE, DEWAR'S WHITE LABEL scotch |

2021553894

RJR NABISCO (formerly R.J. Reynolds Industries Inc.)

| <u>Subsidiary</u> | <u>Product/Service</u> |
|--|---|
| Archer Inc. - | aluminum foil and packaging |
| Artistic Manufacturing Corp. - | ribbons, bows, gift wrap and foil |
| *Bear Creek Corp. - | mail-order sales of fruit, gourmet food and garden plants through HARRY & DAVID and JACKSON & PERKIN'S catalogs |
| Del Monte Corp. - | DEL MONTE fruits, juices, and vegetables, *CANADA DRY ginger ale, club soda and mixers, MORTON'S frozen foods, BRER RABBIT molasses, MY-T-FINE pudding, COLLEGE INN broth, DAVIS baking powder, VERMONT MAID syrup, PATIO Mexican food, ORTEGA foods, CHUN KING Oriental foods |
| Filler Products, Inc. - | snack foods - KORN KURLS |
| *Filmco, Inc. - | vinyl packaging films used to wrap meats and produce in grocery stores |
| Fresher Cooker, Inc. - (renamed Cooker Concepts Inc.) | fast food restaurant chain located in Florida featuring non-fried light menus |
| *Heublein - | A-1 steak sauce, ALMADEN VINEYARDS GREY POUPON mustard, alcoholic beverages including: SMIRNOFF'S vodka, JOSE CUERVO tequila, INGLENOCK wines, KAPPA VALLEY wineries, DON Q rum, BLACK VELVET CANADIAN whiskey, POPOV vodka, RELSKA vodkas, LANCERS wines, HARVEYS BRISTOL CREAM sherry, HEUBLEIN cocktails, VALBON French table wines |
| *Kentucky Fried Chicken | |
| Nabisco Brands, Inc. - | OREO cookies, |

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NILLA WAFERS,
HONEY MAID graham crackers,
PREMIUM saltines,
PLANTERS nuts,
ALMOST HOME cookies,
CHIPS AHOY! cookies,
NUTTER BUTTER peanut butter cookies
SHREDDED WHEAT cereal,
many other cookies, crackers, and
cereals
HOME HEARTH bread mixes,

Pacific Hawaiian Products Co. - HAWAIIAN PUNCH beverages

Skolniks Bagel and Bakery Restaurants

*Sunkist Soft Drinks, Inc. - SUNKIST beverages

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U.S. TOBACCO CO.

| <u>Subsidiary</u> | <u>Product/service</u> |
|------------------------------|--|
| Bon-Vin, Inc. - | distributor of expensive wines |
| Circus Foods, Inc. - | CIRCUS canned nut products and candy bars . |
| Lummis & Co. - | canned and packaged nuts, peanut butter |
| Mastercraft Pipes - | imported pipes and specialty smoking articles |
| National Pencil Co. | |
| National Tobacco Co. Ltd. | |
| Ste. Michelle Vintners - | STE. MICHELLE premium brand wines, generic brand wines, grape and berry wines, dessert wines - port and sherry, POMMERELLE wines, GRANADA wines, HADASSIM koshered wines HERZYL koshered wines |
| Tuckersharpe Pen Co. - | writing instruments and desk sets |
| W.H. Snyder and Sons, Inc. - | HOUSE OF WINDSOR cigars, MARK IV cigars, BAHAI cigars and other brands |

* See attached page for corporate transactions

2021553897

CORPORATE TRANSACTIONS

Buckingham Corp. was sold to BEATRICE FOODS

Gimbels was sold to ALLIED STORES CORP.

Kohl Corp. was sold to GREAT ATLANTIC & PACIFIC TEA CO., INC.

Vita Foods was sold to DEAN FOODS INC.

Progresso was sold to OGDEN CORP.

Liggett Group, Inc. was sold to LE BOW INDUSTRIES INC.

Austin-Nichols was sold to PERNOD RICARD OF PARIS

Brite Industries, Inc. was sold to GARSTAN INC.

National Oats, Inc. was sold to CURTICE-BURNS INC.

Reed Candy Co. was sold to LAURA SECORD CO.

Schenley Industries, Inc. was sold to RAPID-AMERICAN CORP.

Bear Creek Corp. was sold to SHAKLEE CORP.

Canada Dry was sold to CADBURY SCHWEPPES P.L.C.

Filmco, Inc. was sold to ENVIRODYNE INDUSTRIES INC.

Heublin was sold to GRAND METROPOLITAN P.L.C.

Kentucky Fried Chicken was sold to PEPSICO INC.

Sunkist Soft Drinks, Inc. was sold to CADBURY SCHWEPPES P.L.C.

2021553898

APPENDIX D

**Analysis of Current Societal and
Governmental Influences on the Cigarette
Industry of Importance to R&D**

2021553900

PHILIP MORRIS U. S. A.

I N T E R - O F F I C E C O R R E S P O N D E N C E

Richmond, Virginia

To: .Strategic Planning Committee Date: May 27. 1987
From: .R N. Ferguson and M. Waugh
Subject: .Social-Political Context of Cigarette Sales and Use
 in the U.S. - 1987

The major resource for our input to you on the challenges facing our industry was Mr. Jack Nelson, New York Office of P.M, who provided us with much of the information on which the following sections are based.

At this point in time there appear to be five major issue areas facing the cigarette industry. These areas, listed below, will each be discussed in the following sections.

1. Social acceptability and the increased restrictions which are accompanying decreased acceptability
2. Product liability
- 3 Cigarette taxation
4. Advertising and promotion issues
5. Self-extinguishing cigarette

1. Social Acceptability

Almost all cigarette usage occurs in a social context, so that the degree of acceptability of smoking to others becomes the major issue from which pressures on the individual smoker ultimately originate. A product used in a social context can become unacceptable if it violates social mores or if it entails a level of risk intolerable to others.

2021553901

There is convincing evidence that the public perception of risk in general has heightened, due perhaps to major changes in the structure of society - weakened religion, health crazes, aging population. etc. Whatever the root causes, smoking is now perceived as a health risk to non-smokers. The following Roper data undoubtedly underestimates the state of affairs in 1987, but shows the trend.

| | <u>1978</u> | <u>1982</u> | <u>1984</u> |
|--|-------------|-------------|-------------|
| Segregate Smokers/Non-Smokers in Eating Places | 73% | 84% | 90% |
| Segregate Smokers/Non-Smokers in Work Places | 61% | 65% | 68% |
| Ambient Smoke Probably Hazardous to Non-Smokers | 58% | 65% | 68% |
| Smokers <u>frequently</u> uncomfortable smoking around others | 13% | 14% | 18% |

When this is coupled with the fact that smokers are a non-militant, shrinking minority, it is easy to discern why zealots and politicians can use them for "target practice" with little concern.

From the social acceptability issue, which is founded largely on the purported harm of ETS to the non-smoker, have proceeded the restriction measures. The following summary table indicates that these legislative measures are meeting with increasing success.

| Smoking Restriction Bills | <u>1980</u> | <u>1981</u> | <u>1982</u> | <u>1983</u> | <u>1984</u> | <u>1985</u> | <u>1986</u> |
|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Debated | 158 | 155 | 165 | 207 | 228 | 374 | 387 |
| Enacted | 32 | 45 | 44 | 67 | 66 | 80 | 149 |

These laws are focused on the state and local level - workplace or restaurants in general. The full page TI table attached at the end of this memo shows the diverse effects of such laws on a state by state basis. In addition to this, ~50% of employers surveyed had or were considering workplace smoking restrictions. It is of concern that large numerical advances in workplace/restaurant bans are being made in nationwide "trendsetter" states such as California.

Since the current decrease in social acceptability, and all the negatives it entails, is based on the powerful ETS weapon, we have also enclosed a one page summary on this subject, prepared by the Philip Morris Corporate Affairs Department, as a second attachment to this memo. It is apparent that the effects of ETS on others is now the most

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powerful anti-smoking weapon being employed against the industry.

2. Product Liability

Almost half of the 130 pending product liability suits involved Philip Morris and thus this issue is of substantial interest to us. Apparently most of the suits fall in one or more of three categories of legal arguments.

- A. Product dangers and failure to warn of the dangers.
- B. Undermining the required warning - by various forms of promotion and by challenging health data.
- C. Causality of illness and addiction to the product such that stopping became impossible.

In the unlikely (but possible) event of plaintiffs winning some of these cases, a deluge of suits would be spurred on by "hungry" lawyers. It is possible that at some point in time a significant portion of the retail sales price of cigarettes would be required to fund these suits and related damage awards; i.e., a significant price increase would be necessary.

The only encouraging trend here is the general public revolt against large damage awards and the movement to reform state laws on liability.

3. Cigarette Taxation

This is a complicated but critical issue. Cigarettes are not only taxed at the federal level but at the state and possibly local level. To the extent that governmental bodies tend to regard this tax as a "cash flow", there is a degree of reluctance to destroy the industry. Also, many realize this is a very regressive tax, which tends to restrain some legislators (except the zealots). The problem with tax increases is that it can, under certain circumstances, decrease consumption, just as desired by the social engineers proposing these increases.

It is a fact of life that the State and Federal Excise taxes move in only one direction--up. The average state tax rate table below suggests that a large federal increase is more of a problem than the generally smaller increases enacted at the state and local level in the last few years. The federal budget deficit, and the lack of vigorous opposition from the White House, makes a federal excise tax increase a real possibility in the near future.

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State
Average Tax Rate

| | |
|---------------|-------|
| Current | 18.25 |
| June 30, 1986 | 17.32 |
| June 30, 1985 | 15.77 |
| June 30, 1984 | 15.44 |
| June 30, 1983 | 14.54 |

A separate but related issue is the pressure from some quarters to replace the current excise tax with an Ad Valorem tax - an incremental percentage of the sale price. This is a serious issue for one competitive reason - it would tend to increase the price advantage of the generic versus full margin markets. Hawaii is the only state at present with such a tax.

4. Advertising and Promotion

The cigarette industry accepted a total ban on television and radio advertising in 1972. Opponents of cigarette use have convinced themselves (and some others) that a total ban on advertising would undermine the industry. It is by no means certain that the Supreme Court would not uphold such a law, despite the commercial speech interpretation of the First Amendment.

The anti-smoking effort rests on a number of assertions, such as:

- a) Cigarettes are more heavily advertised than any other product.
- b) This heavy advertising induces non-smokers, especially young people, to smoke.
- c) Taxpayers subsidize tobacco ads.
- d) Ads are deceptive since they lower awareness of health risks.

Each of these arguments can be rebutted by facts, but it is of some concern that there is a moderate level of support for such bans. A total ban would be particularly damaging since it would channel competitive forces into areas such as low price and could possibly destabilize current market shares. Such proposals at the state and local level are making very little progress.

Another aspect of cigarette promotion is state and local sampling laws. Since 1966, 14 states have considered sampling ban bills, but none has banned sampling to adults. There have been some local level actions to ban sampling even to consenting adults. The number of these restrictions at

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present, in comparison to other industry challenges, does not present a major issue.

5. "Self-Extinguishing"

Cigarettes continue to be associated with a large number of fires, many of which cause loss of life and property. It is not known if the technology exists to make cigarettes self extinguish, but this does not prevent a number of states from at least considering legislating such a product into existence. The federal feasibility study, mandated by Congress in 1984, has slowed down activity at the state level in the last three years.

On October 30, 1987, the study groups final report is due. Depending on this report, there could be actions at either the federal level or worse, numerous differing state level regulations.

If legislation is passed, it would probably be necessary to modify several aspects of current cigarette construction. This could have a negative impact on per unit costs. Of more concern, it would be hard to maintain the subjective acceptability of our major brands if design changes were legislated into these products. This is particularly unfortunate since there is really little reason to expect any increase in fire safety without some nationwide effort to treat fabrics with fire retardant chemicals.

Summary

The increased success of anti-smoking forces at undermining the social acceptability of smoking is a real and present challenge for our industry. Rebuttal is crucial but reversal of the flow of events depicted here is unlikely. This gloomy picture of 1987 and beyond must be interpreted in terms of opportunity as well as challenge. The very importance of the above issues suggest that products which can successfully address some or all of these needs can still be very successful. A threat to the industry can be an opportunity for the company which can find consumer acceptable answers to the types of challenges discussed in this memo.

/ds

Enclosures

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Summary of Arguments on
Environmental Tobacco Smoke (1/23/87)

(P.M. Corporate Affairs Department)

Status

Environmental Tobacco Smoke (ETS) (aka passive smoking, ambient smoke, sidestream smoke, and involuntary smoking) has been a legal issue since 1975 when eight states enacted restrictions on smoking in public places other than elevators. These early smoking restrictions were motivated primarily by the annoyance rather than any scientific evidence of health effects. However, the anti-smokers and media attention given to the purported effects of ETS on health have persuaded forty states, over 600 localities, and hundreds of businesses to restrict smoking in the workplace and other public places. The federal government is considering banning smoking on commercial flights, among military personnel, and in government buildings. The 1986 Surgeon General's Report asserted that ETS "can cause" lung cancer in non-smokers.

Summary Arguments

The first Surgeon General's Report on Smoking and Health in 1964 addressed (ETS), but admitted that more research was needed. The 1979 Surgeon General Report stated that "healthy nonsmokers exposed to cigarette smoke have little or no physiological response to smoke." This report also called for more research. Between 1983 and 1984, 65 internationally known physicians and scientists met three times to address the health effects of passive smoking and concluded, collectively and independently, that no conclusion can be made about whether (ETS) has any health effect on nonsmokers.

In 1986 reports of the National Research Council and the Surgeon General clearly rejected any significant connection between non-smoker ETS exposure and cardiovascular disease, chronic obstructive lung disease or acute respiratory disease (asthma). The Surgeon General's report did assert that ETS exposure "can cause lung cancer" in non-smokers. However, that conclusion was largely political in character. Of the 13 studies reviewed by the report, only 3 showed any statistically significant relation between ETS exposure and lung cancer in non-smokers. These studies are tainted by misclassification of former smokers as non-smokers which accounts for all the supposed ETS related lung cancer. Moreover, in a private communication to a public health official in January 1986, the Surgeon General admitted that the "currently available data do not support a conclusion that exposure to environmental tobacco smoke represents a health hazard."

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Finally, none of the 3 studies examined ETS exposure effects outside the home. Indeed, if ETS were treated as any other environmental pollutant, the EPA would impose no restriction on exposure because its health effects are negligible.

Impact

The ETS issue has become the principal force behind the anti-smoking movement's effort to proscribe smoking and ostracize smokers. Despite its non-effect on non-smokers, ETS is the most powerful weapon the zealots have in their crusade.

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(Part)

STATE
SMOKING RESTRICTION LAWS
January 1987

The Tobacco Institute
State Activities Division

| State | Any Public Bldg. Posted As No Smoking | Elevators | Public Trans- portation | Educational Facilities | Cultural Facilities | Health Care Facilities | Govt. Owned Bldg./Public Meetings | Food Stores | Retail Stores | Restaurants | Workplace- Government | Workplace- Private Sector |
|----------------|---|-----------|----------------------------|---------------------------|------------------------|---------------------------|---|-------------|---------------|-------------|--------------------------|------------------------------|
| ALABAMA | • | • | • | • | • | • | • | • | • | • | • | • |
| ALASKA | | | | | | | | | | | | |
| ARIZONA | | • | • | • | • | • | • | • | | | • | |
| ARKANSAS | | | | | | • | | | | | | |
| CALIFORNIA | | | • | • | • | • | • | • | | | • | • |
| COLORADO | • | • | • | • | • | • | • | • | | • | • | • |
| CONNECTICUT | | | • | • | | | | | | • | • | • |
| DELAWARE | | | • | • | | | | | | | | |
| FLORIDA | | • | • | • | • | • | • | • | • | • | • | • |
| GEORGIA | • | • | | | | | • | | | | | |
| HAWAII | | • | • | • | • | • | • | • | • | • | | |
| IDAH | | | | | • | | | • | • | • | | |
| ILLINOIS | | | | | | | | | | | | |
| INDIANA | | | | | | | | | | | | |
| IOWA | | • | • | | • | • | • | | | | | |
| KANSAS | | • | • | | • | • | • | | | | | |
| KENTUCKY | | | | • | | | | | | | | |
| LOUISIANA | | | | | • | | | | | | | |
| MAINE | • | | | | | • | • | | • | | • | • |
| MARYLAND | | • | • | | | • | | | | | | |
| MASSACHUSETTS | | • | • | • | • | • | • | • | | | • | • |
| MICHIGAN | | • | • | • | • | • | • | • | • | • | • | • |
| MINNESOTA | • | | • | | | | | | | | | |
| MISSISSIPPI | | | | | | | | | | | | |
| MISSOURI | | | | | | | | | | | | |
| MONTANA | • | • | • | • | • | • | • | • | • | • | • | • |
| NEBRASKA | • | • | • | • | • | • | • | • | • | • | • | • |
| NEVADA | | • | • | • | • | • | • | • | • | • | • | • |
| NEW HAMPSHIRE | • | • | • | • | • | • | • | • | • | • | • | • |
| NEW JERSEY | • | • | • | • | • | • | • | • | • | • | • | • |
| NEW MEXICO | | | | | | | | | | | | |
| NEW YORK | | | • | | • | | | | | | | |
| NORTH CAROLINA | | | | | | | | | | | | |
| NORTH DAKOTA | • | • | • | • | • | • | • | | | • | | |
| OHIO | | • | • | • | • | • | • | | | | | |
| OKLAHOMA | | • | • | • | • | • | • | | | | | |
| OREGON | • | • | | • | • | • | • | • | • | • | • | • |
| PENNSYLVANIA | | • | | | | • | | | • | • | | |
| RHODE ISLAND | | • | • | • | • | • | | • | • | • | • | • |
| SOUTH CAROLINA | | | | | | | | | | | | |
| SOUTH DAKOTA | | • | • | • | • | | | | | | | |
| TENNESSEE | | • | • | • | • | • | | | | | | |
| TEXAS | | • | • | • | • | • | • | | | | | |
| UTAH | • | • | | • | • | • | • | • | • | • | • | • |
| VERMONT | • | | | | | | • | | | | | |
| VIRGINIA | | | | | | | | | | | | |
| WASHINGTON | | • | • | • | • | • | • | • | • | • | | |
| WEST VIRGINIA | | | • | • | | | | | | | | |
| WISCONSIN | | • | • | • | | • | • | • | • | • | • | • |
| WYOMING | | | | | | | | | | | | |
| 41 States | 13 | 26 | 32 | 23 | 27 | 30 | 25 | 17 | 12 | 15 | 17 | 10 |
| D.C. | | | | | | | | | | | | |

Fire Prevention
Laws are not
included.

*Local Authorizing
Statute

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APPENDIX E

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APPENDIX E

Initial List of Potential Needed Technology at R&D

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SUMMARY OF POTENTIAL NEW SCIENCE AND TECHNOLOGY NEEDS

The R&D management and senior R&D staff were requested to provide their assessments of our new science and technology needs for the next several years. Respondents were asked to identify the strategic objectives to be supported by their suggested new technologies. It is reassuring to note that the strategies, goals and programs suggested by most were quite similar to those identified by the Planning Committee.

Some respondents took the opportunity to comment on current programs or to address operational problems. This input has not been ignored. However, for the following compilation, a "new" area of science or technology was defined as one where it was felt that Philip Morris R&D currently needs more knowledge or expertise to accomplish the proposed objectives. In this context, a technology which is commonplace in universities or other industries could be "new" to us.

In the outline which follows we have attempted to represent the totality of the respondent's inputs in order to provide a starting place for the discussion and selection of appropriate strategies to accomplish our strategic goals.

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GOAL 1: AGGRESSIVELY SUPPORT THE CURRENT BUSINESS**A. Quality Program:**

1. High Speed Optical Inspection.
 - a. Current collaborative program between R&D and Engineering.
 - b. State-of-the Art technology - Very limited availability. (Current R&D contract with Carnegie-Mellon University.)
2. Remote Sensing for Product/Process Monitoring.
 - a. Microwave
 - b. Optical
 - c. Infrared
 - d. Ultrasonics
 - e. X-Ray
3. Molecular Level Understanding of Paper, Shred, Adhesive Interactions.
 - a. Understanding is currently qualitative.
 - b. Limited external availability of this specialized knowledge.
4. Machine Signature Analysis and Trending.
 - a. New area with limited external availability.
5. High Speed Signal Processing.
 - a. Rapidly developing area - external availability limited.
6. Artificial Intelligence/Expert Systems.
 - a. Limited R&D activity - Some development work in Engineering and I.S.
 - b. Expert systems have current potential - Good external availability (Universities & Vendors).
 - c. True "Artificial Intelligence" still fairly primitive. Good availability of information, but applications currently limited.
7. Vision-Aided Robots.
 - a. Limited external availability of this developing technology.

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8. Tamper-Evident Packaging.

- a. Limited current R&D activity.
- b. Limited external availability (often proprietary).

9. Microbiological Control During Processing.

- a. Some current R&D activity (RL stability), limited staff.
- b. Easy external availability.

B. Response to Government Regulation/Response to Marketing:

- 1. Fundamental Research (See 6 Below).
- 2. See Other Programs as Appropriate.

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SCIENCE AND TECHNOLOGY NEEDS:**GOAL 2: DEVELOP PRODUCTS WHICH ADDRESS THE CONSUMERS' DESIRE TO REDUCE THEIR HEALTH CONCERNS****A. Non-Burning Article and Optional Smoking Article Programs:**

1. Mechanisms and Materials for Flavor Storage and Release.
 - a. Some current R/D activity.
 - b. Limited external availability. (Current contract in encapsulation.)
2. Fundamental Research (See Section 6 Below).
 - a. Aerosols.
 - b. Flavors.

B. Cigarette with Low Biological Activity Program:

1. Thermodynamics in Supercritical Fluids - Critical Properties.
 - a. Significant current R/D activity - limited staff.
 - b. Ready external availability. (Currently consulting with Ga. Tech.)
2. Fundamental Research (See Section 6 Below).
 - a. Flavors.
 - b. Biotechnology.
 - c. Filtration.

C. Low Tar/High Taste Program:

1. Flavor Volatilization from "Low Tar" Substrates.
 - a. Very limited current R/D activity.
 - b. No known external availability.
2. Thermodynamics in Supercritical Fluids - Critical Properties.
 - a. Significant current R/D activity - limited staff.
 - b. Ready external availability. (Currently consulting with Ga. Tech.)

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3. Fundamental Research (See Section 6 Below).

- a. Flavors.
- b. Filtration.
- c. Combustion.
- d. Aerosols.

D. Low Nicotine (ART) Program:

1. Thermodynamics in Supercritical Fluids - Critical Properties.

- a. Significant current R/D activity - limited staff.
- b. Ready external availability. (Currently consulting with Ga. Tech.)

2. Selective Membrane Separations.

- a. No current R/D activity.
- b. State-Of-Art Area - Very limited external availability.

3. Processing Plant Materials (Corrosion).

- a. No current internal R/D activity.
- b. Ready external availability - (Current R/D contract with the University of Virginia.)

4. Fundamental Research (See Section 6 Below).

- a. Biotechnology.

E. Alternate Nicotine Program:

1. Consumer Research - (See Section 6 Below)

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SCIENCE AND TECHNOLOGY NEEDS:**GOAL 3: DEVELOP PRODUCTS WHICH ADDRESS THE PUBLIC'S DESIRE TO REDUCE ENVIRONMENTAL TOBACCO SMOKE****A. Low Sidestream Visibility Program:**

1. Improved Wrapper Technology.
 - a. Recently initiated active R&D efforts.
 - b. Considerable dependence upon suppliers.
 - c. Limited external availability - often proprietary.
2. Environmental Tobacco Smoke (ETS) Monitoring.
 - a. No current R&D effort.
 - b. Mobile monitoring facilities commercially available.
3. Fundamental Research (See Section 6 Below).
 - a. Aerosols.
 - b. Combustion.

B. Odor Modification Program:

1. See Low Visibility Above.
2. Chemical/Odor Release Mechanisms and Materials.
 - a. Current R&D awareness - Little activity.
 - b. Limited external availability. (Current Contract in encapsulation).

C. Decreased Irritation Program:

1. See Low Visibility and Odor Modification Above.
2. Physiology of Irritants.
 - a. No current R&D activity.
 - b. Limited external availability.

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D. Ashtray Aroma Program:

1. Chemical Absorbents.
 - a. No current R&D activity.
 - b. Fundamental absorbent information readily available; information on specific absorbents for our purposes extremely limited..
2. Absorbent Storage and Release Mechanisms.
 - a. No current R&D activity.
 - b. External information very limited.

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SCIENCE AND TECHNOLOGY NEEDS:**GOAL 4: DEVELOP NEW PRODUCTS WHICH CAN BE MARKETING USING CURRENT STRATEGIES AND GIVE SMOKERS A PRODUCT ADVANTAGE****A. Menthol Program:**

1. Menthol Storage & Release Mechanisms.
 - a. Current R&D efforts in release polymers and sorption/desorption materials.
 - b. No known external availability of these technologies.
2. Fundamental Consumer Research (See Section 6 Below).

B. Generic/Value and Market Segment Programs:

1. Fundamental Consumer Research (See Section 6 Below)

C. Reduced Tobacco Program:

1. Adhesion of Porous Materials
 - a. R&D activity has been directed toward applications/problem solving. Little activity in fundamental understanding.
 - b. Limited external availability of information on adhesion of porous materials.
2. Effects of "Gums" on Binder Application and adhesion.
 - a. Previous R&D activity; none currently.
 - b. Information on adhesion readily available externally.
 - c. No known sources of external information on subjective effects.
3. Mathematical Simulation of Bound Beds.
 - a. Fundamental models previously developed at R&D. Little current activity/application.
 - b. State-Of-Art computational approaches/hardware required. Very limited external availability. (Current consulting arrangement with Brandeis University.

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4. High Speed Machinery for Packed Bed Formation.
 - a. Active R&D efforts/limited staff.
 - b. No known external sources of this Specialized information.
5. Microwave Drying.
 - a. Limited R&D activity in specific applications.
 - b. Limited external availability (Often Proprietary).
6. Tobacco Rod Visualization & Monitoring.
 - a. Neutron Radiography - Current development program under contract with University of Virginia.
 - b. NMR Imaging - Current feasibility study with Colorado State University. Increasing commercial availability.
 - c. Microwave Spectroscopy - Current active R&D program. State-Of-Art work with very limited external availability.

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SCIENCE AND TECHNOLOGY NEEDS:**GOAL 5: IDENTIFY NEW PRODUCT/PROCESS CONCEPTS AND DEVELOP PRODUCTS/PROCESSES FOR THE INTERNATIONAL MARKET DEVELOP****1. Product Development:**

- a. Consumer Testing Research (See Section 6 Below).

2. Process Development:

- a. Processes matched to the technology level and technology needs of particular locations.
- b. See reduced Tobacco Program - Goal 4 above.

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SCIENCE AND TECHNOLOGY NEEDS:

GOAL 6: PROVIDE A BROAD FOUNDATION OF BASIC RESEARCH THAT WILL GENERATE NEW PRODUCT CONCEPTS IN 5-15 YEARS**A. Consumer Testing Program:**

1. Consumer Preference Determinations.
 - a. Current R&D efforts largely address consumer response to "Standard" products.
 - b. Tools and techniques are readily available externally, but of limited resolution.
2. Predictors of Consumer Response.
 - a. Needed are abilities to identify new market niches and marketable departures from our current products.
 - b. Availability of state-of-the-art tools is extremely limited.
3. Arousal Modulation versus Neural Processing.
 - a. State-of-the-Art Area - Little or no external availability.

B. Flavor Research Program:

1. Chemical Storage/Release Materials and Mechanisms.
 - a. Limited current R&D activity.
 - b. External availability ranges from easy to non-available.
2. Flavor versus Chemical Species.
 - a. Active R&D efforts - limited staff.
 - b. External availability of chemical identity versus flavor or taste information is very limited.
3. Molecular Structure Calculations.
 - a. Limited internal R&D effort.
 - b. Reliable molecular parameter calculations and measurements of limited external availability. (Current contract research with VPI&SU and Colorado State University.)

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4. Flavor versus Visual and/or Tactile Stimulation.
 - a. No current R&D effort.
 - b. Little or no externally available information.

C. Biotechnology Program:

1. Alkaloid Reduction.
 - a. Active R&D program.
 - b. External availability is increasing. (Current R/D contract with Calgene.)
2. Lowered Biological Activity.
 - a. No current internal R&D activity.
 - b. External availability extremely limited.
3. Flavor Modification.
 - a. No current internal R&D activity.
 - b. External availability extremely limited.
4. Micro-Injection of DNA.
 - a. No current R&D activity.
 - b. State-of-the-Art Area - Technology Available but limited.

D. Filtration Research Program:

1. Particle Size Selection.
 - a. Limited R&D activity.
 - b. No known external availability.
2. Species Selection.
 - a. No current R&D activity.
 - b. Kinetic methods - No known external availability.
 - c. Chemical methods - No known external availability.
 - d. Catalytic methods - Limited information available externally.

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E. Altered Burn Characteristics/"Combustion" Program:

1. Control of Local Burn Temperature.
 - a. No R&D activity.
 - b. No known external availability.
2. Control of Local Heat and Mass Transfer.
 - a. Limited current R&D activity.
 - b. Very limited external information.
3. Local Chemical Kinetics.
 - a. Limited current R&D activity.
 - b. Limited external availability.
4. Roles of Ionic & Metallic Components.
 - a. No current R&D activity.
 - b. Some external information available of possibly limited applicability.

E. Aerosol Research Program:

1. Aerosol Physics.
 - a. Recently initiated R&D work.
 - b. Thermodynamics, growth kinetics information available externally.
 - c. Particle nucleation initial growth information very limited. (Current Contract with Colorado State University.)
2. Nucleation Mechanisms.
 - a. No current internal R&D activity.
 - b. Information From external sources is extremely limited. (Current R&D Contract with Colorado State University.)
3. Particle Composition.
 - a. No current R&D activity.
 - b. No known external sources for particle composition measurements.
4. Transfer Mechanisms for Non-Volatile Components.
 - a. Limited internal R&D activity.
 - b. No known external availability.

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5. Flavor versus Particle Size and Composition.

- a. No current R&D activity.
- b. No known external availability.

6. Particle Transfer Physiology.

- a. No R&D activity.
- b. Information available externally.

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ACKNOWLEDGMENTS

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